THE

BRITISH AND FOREIGN

MEDICO-CHIRURGICAL

REVIEW

OR

QUARTERLY JOURNAL

OF

PRACTICAL MEDICINE AND SURGERY.

VOL. XVII.

JANUARY—APRIL, 1857.

LONDON:

JOHN CHURCHILL, NEW BURLINGTON STREET.

MDCCCLVII.

BRITISH AND FOREIGN

MEDICO-CHIRURGICAL REVIEW

QUARTERLY ADVERTISER, APRIL, 1856.

Charge for Advertisements, Bills, &c.

	£	s.	d.		£	s.	d.
For 6 lines and under	0	6	0	For half a page	1	3	0
Every additional line	0	1	0	A whole page	2	0	0

Bills Stitched in £2 0 0

NEW WORKS PRINTED FOR WALTON & MABERLY,

UPPER GOWER STREET, & IVY LANE, PATERNOSTER ROW.

I.

A Practical Treatise on Continued Fevers. By William JENNER, M.D., Physician to University College Hospital and the Hospital for Sick Children, Assistant Physician to the London Fever Hospital, &c. 1 vol. [*Preparing.*

II.

The Microscope. By Dr. Lardner. With 147 En-gravings. 12mo, 2s. cloth (From the "Museum of Science and Art.")

III.

Handbook of Organic Chemistry. By William Gregory, M.D., Professor of Chemistry in the University of Edinburgh. Fourth Edition, greatly enlarged and improved. 1 vol. [*Early in April.*

IV.

Lardner's Handbook of Optics. Illustrated by 260 Engravings. 1 vol. 5s. cloth lettered.

V.

—rdner's Handbook of Hydrostatics, Pneumatics, and HEAT. Illustrated by 292 Engravings. 1 vol. 5s. cloth lettered.

VI.

Lardner's Handbook of Mechanics. Illustrated by 357 Engravings. 1 vol. 5s. cloth lettered.

VII.

The Essentials of Materia Medica, Therapeutics, and THE PHARMACOPEIAS. For the Use of Students and Practitioners. By ALFRED BARING GARROD, M.D., Professor of Materia Medica, Therapeutics, and Clinical Medicine in University College, London. Fcap. 8vo, 6s. 6d. cloth.

VIII.

Mr. Quain on Diseases of the Rectum. Second Edition, with Additions. 7s. 6d.

IX.

Dr. Walshe on Diseases of the Lungs and Heart Second Edition, revised and almost re-written, 1 vol. 12s. 6d. cloth.

THE CYCLOPÆDIA OF PRACTICAL RECEIPTS—*continued.*

only the leading properties of the various substances converted to human use, but also the latest and most economical modes of manipulation, whether in the factory, the laboratory, or the household. The present edition is stated to have been entirely re-written, and remarkable care seems to have been bestowed to render the explanation of each formula or process clear and worthy of confidence

---

This work is particularly rich in information on the following subjects:

The preparation, economic applications, and commercial value of the various substances employed as food, beverages, medicines, clothing, fuel, &c, with simple means for detecting their adulteration or sophistication.

The arts of brewing, distillation, fermentation, malting, wine making, cyder-making, &c., including recent discoveries; also the best methods of alcoholmetry, testing, &c., with explanations of the necessary decimal calculations.

The compounding, mixing, flavouring, cellar-management, bottling, &c., of wines, liqueurs, cordials, beer, porter, and all other distilled or fermented liquors.

Commercial acetimetry, acidimetry, alkalimetry, chlorimetry, &c., as practised in the chymical laboratory, the bleach and dye-house, and other manufactories.

Manures, soils, minerals, ores, &c., and their commercial assays; adapted to the wants of farmers, agriculturalists, guano dealers, &c.

Chemistry of every-day life, embracing domestic economy, cookery, hygiène, ventilation, preservation of food, &c., &c., of essential value to every house-keeper and head of a family.

Popular medicine, surgery, toxicology, &c., more especially intended for the use of emigrants, travellers, clergymen, and, generally, in the absence of ordinary medical aid.

The preparation and manufacture of the various substances used as pigments, and their reduction to the commercial form of mixed paints,—the preparation of varnishes and lacquers, &c., adapted to the wants of artists, oil and colour-men, wholesale dealers, &c., &c.

Formulæ, processes, &c., connected with pharmacy, pharmaceutical chemistry, and medicine: embracing all the pharmacopœial and new preparations, both British and foreign, and forming the most comprehensive formulary and general book of reference ever offered to the notice of the chemist, druggist, and medical practitioner.

Very rich in valuable tables, many of which have been calculated exclusively for this work; and it is illustrated with engravings wherever the subject demanded the same.

To tradesmen and manufacturers of all classes it will prove invaluable.

No work ever deserved the title of a "million of facts" more than the present one.

LONDON: JOHN CHURCHILL, NEW BURLINGTON STREET.

CONTENTS OF No. XXXIV.

OF THE

BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW.

APRIL, 1856.

Analytical and Critical Reviews.

Bibliographical Record.

Original Communications.

Chronicle of Medical Science.

THE

BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW.

APRIL, 1856.

PART FIRST.

Analytical and Critical Reviews.

REVIEW I.

1. *Report of the Medical Council to the Right Hon. Sir Benjamin Hall, Bart., M.P., President of the General Board of Health, &c., &c., in relation to the Cholera Epidemic of* 1854. Presented to both Houses of Parliament by command of her Majesty.—*London*, 1855. pp. 9.

2. *Report of the Committee for Scientific Inquiries in relation to the Cholera Epidemic of* 1854. Presented to both Houses of Parliament by command of her Majesty.—*London*, 1855. pp. 129.

Appendix to the Report of the Committee for Scientific Inquiries in relation to the Cholera Epidemic of 1854. pp. 322.

3. *Reports relating to the Sanitary Condition of the City of London.* By JOHN SIMON, F.R.S., &c.—*London*, 1854. pp. 312.

4. *Report of the Commissioners appointed to inquire into the Causes which have led to or have aggravated the late outbreak of Cholera in the towns of Newcastle-upon-Tyne, Gateshead, and Tynemouth.* Presented to both Houses of Parliament by command of her Majesty.—*London*, 1854. Fol. pp. 580.

5. *Report made by Dr. Milroy to the Colonial Office on the Cholera Epidemic in Jamaica*, 1850–51. Ordered by the House of Commons to be printed, 1854. Fol. pp. 147.

6. *Report on the Cholera which attacked the Fleet in the Black Sea in August*, 1854, *more particularly as relates to her Majesty's ships*, Britannia, Albion, *and* Trafalgar. Printed by order of the Right Hon. the Lords Commissioners of the Admiralty, 1854. Fol. pp. 15.

7. *Report upon the Sanitary Condition of New Orleans.* By E. H. BARTON, M.D. pp. 249. Being an Appendix to the *Report of the Sani-*

tary Commission of New Orleans on the Epidemic Yellow Fever of 1853. Published by authority of the City Council of New Orleans. pp. 542.

8. *Report on the Cholera Outbreak in the parish of St. James, Westminster, during the Autumn of* 1854. Presented to the Vestry by the Cholera Inquiry Committee, July, 1855.—*London*, pp. 175.

To investigate the history of epidemic diseases, to trace them from their commencement through their periods of growth, culmination, and decline; to mark the circumstances under which they arise, the character and condition of the localities in which they prevail, and of the persons they attack, forms one of the most interesting of medical inquiries. To determine the nature of their proximate causes, the laws which govern them, the conditions requisite for their production or their active development, and the possibility of their prevention or mitigation, is perhaps the most important of medical problems. The thorough elucidation of the former affords the best chance for solving the latter. For this purpose, however, it is necessary not merely to investigate individual cases during the existence of an epidemic visitation, but also to inquire into the character of successive outbreaks in various localities; to ascertain the several phases presented by the same disease at different periods in the same and in different places, and to inquire into the influence exercised over the character of the disease by the varying state and conditions of the populations amidst whom it prevails. Rightly to appreciate this influence, it is necessary to become acquainted with the ordinary result of the circumstances under which the people are placed. Without the knowledge of what may be termed the normal effect of these, it is impossible to estimate justly their agency in disease. Thus the history of an epidemic should comprise some account of the state of the public health, both previous and subsequent to its visitation, as well as of the conditions by which it is affected. Unfortunately, such investigations have hitherto only been entered on when the enemy has given undeniable evidence of its presence; most frequently not until after it had reached or even passed its acme. Investigations so extensive as those at which we have thus briefly glanced, would require for their full realization the co-operation of many observers. Hitherto no such system of observation has ever been organized in this country, nor could it be effectually carried out excepting under the direction of Government, such inquiries being totally different from the everyday duties of the busy practitioner. The only disease in which there has been any attempt on the part of the public authorities to institute such inquiries, is cholera; and, as already intimated, these investigations have rarely commenced until the first force of the disease had expended itself. There has been no systematic inquiry as yet, into the ordinary effect of the causes which are supposed to be necessary for the more malignant development of this pestilence. Much valuable matter illustrative of the nature and history of cholera, has nevertheless been collected, both by public and private inquirers; from which, as contained in the several documents whose titles are placed at the head of this article, together with such as we have gleaned from other sources, we propose to put together the chief features in the local history of cholera, so far as these may seem to be at present ascertainable.

It is commonly accepted that cholera, after prevailing occasionally in India from periods co-eval with the earliest records, appeared with almost unprecedented violence in the Delta of the Ganges in 1817, and from thence as a centre gradually extended itself over the Indian continent. After a time it spread into China, reached Ceylon, and other islands of the Indian Ocean, and crossing the Equator, broke out in the Isle of France. Taking a westward course, it reached Persia in 1821, where it lingered, abating with the cold of winter, and regaining strength with the summer heat, until 1823. In the latter year it appeared in the southern provinces of Russia, and attacked Astrachan in the month of September. It here paused upon the very confines of Europe, and for several years its course in a westward direction was arrested. In 1829, six years after its first visit to Astrachan, it reached Orenburgh by way of Tartary, and in the following summer re-appeared in Astrachan, where it proved much more fatal than at its former visit. It now rapidly extended westward and northward. Following chiefly the course of the great rivers: it reached Moscow, the ancient capital of Russia, in September, and showed itself within a short distance of St. Petersburg before winter. In the following spring it extended to Archangel, the most northern port of Europe, and through Riga, Dantzic, and other towns on the borders of the Baltic to Hamburgh. Late in October it appeared at Sunderland, on the north-east coast of England, where it was believed to have been introduced by a ship from Hamburgh. Such is a brief but tolerably accurate sketch of the geographical history of epidemic cholera, and of its supposed advent in Britain. Let us now give a short glance at the leading features of its history as an epidemic in this country.

Very soon after the appearance of the pestilence in Sunderland, its presence was recognised in several other parts of the kingdom. Altogether the first epidemic extended from October, 1831, to December, 1832, and carried off upwards of 30,000 persons. The next great epidemic, after following a very similar course, appeared at Astrachan in June, 1847; at Moscow in September; at Berlin in June, 1848; Hamburgh in August; in London and other parts of England in September. It is, however, worthy of note, that of the 1931 deaths referred to cholera in 1848, 829 occurred in the first nine months of the year, and previous to the presumed arrival of the epidemic from abroad. The third great outbreak in this country commenced at Newcastle-upon-Tyne, on the 1st of September, 1853. Before the end of the month it had appeared in the metropolis and in other parts of the kingdom. As on former occasions, the pestilence had ravaged Germany some time before its arrival in England. The epidemic now, for the first time, visited Copenhagen, where 4083 persons fell victims to its attack out of a population of about 125,000. This history has commonly been considered as affording *primâ facie* evidence that cholera is an exotic disease, the product of another climate, which, transplanted by human intercourse into this country, or spreading thither from its eastern birth-place by means of some hidden telluric influence, has here met with conditions favourable for its development. By most persons the existence of a poison, somehow introduced from abroad, is believed to be necessary for the production of cholera, although majority of inquirers disbelieve in its spread chiefly by means

of contagion. To explain the production of cholera in England in accordance with this view, and with the undeniable correctness of the main points, in the brief outline of its history here given, several explanations have been proposed. Into a consideration of the nature or plausibility of these theories it forms no part of our present intention to enter. They all agree in assigning an eastern origin to the poison of cholera, which is believed to have either reached this country by means of direct human intercourse, as by fomites or individual contagion; or the poison itself is assumed to be migratory, and to have come hither by a kind of wave-like extension from India. With the exception of a single, and in our belief unproved, opinion,—very attractive from its simplicity, but at variance with a great many facts in the history of cholera,—which considers the specific poison to reside in the peculiar excreta from the gastro-intestinal mucous membrane of cholera patients, all these theories consider the existence of certain local conditions, or of a predisposition in the inhabitants of infected districts, as usually necessary to give strength and vitality to the presumed poison. Thus it will greatly depend upon the degree of this local or personal predisposition whether the poison excites a moderate outbreak extending over a considerable period, or a sudden and violent explosion, as at Gateshead, on Christmas eve, 1831; as in the memorable outbreak in St. James's, Westminster, so admirably described in the report presented to the vestry by the cholera inquiry committee; or as on board H.M.S. *Britannia* in the Black Sea, both in 1854. Since, however, the local circumstances which are thus believed to give energy to the ferment are pretty constant, there is a difficulty in understanding why the disease should cease so suddenly as it often does; unless, indeed, we adopt the solution suggested by Mr. Simon, who surmises that the local atmosphere is after a time exhausted of its capability for further zymotic action, just as the fluids of a person who has recently passed through an exanthematous disease are, for a time at least, incapable of being similarly influenced, although again brought into relation with the specific poison. Neither, if cholera be altogether dependent upon any form of contagion for its spread, is it easy to understand how it should ever cease to extend itself in a large city so long as there remain any persons upon whom the poison can act. In truth, whilst each of the opinions is apparently supported by a large amount of evidence, each is equally opposed by a considerable number of obstinate facts.

No doubt "the phenomena of this disease, however capricious they may seem, are obedient to some absolute uniformity as yet beyond our ken—are sustained by that same rigid sequence of cause and effect which is imposed on all remaining nature;" but no explanation hitherto proposed meets the circumstances of the case in that universal manner which must coincide with truth. In fact, the period has not yet arrived when we may safely dogmatize on the subject. Our present object should be carefully to collect information, the interpretation of which may only be attempted with safety when it appears to flow directly and evidently from the evidence itself. The theories here referred to agree only in the two main points,—that cholera is induced by a special poison, and that this is of foreign extraction.

This, then, is one side of the medal: let us proceed to consider the reverse. The possibility of cholera being of indigenous growth has some-

times been hinted at, but scarcely ever been seriously entertained, although many arguments of much weight might be adduced in favour of the supposition. We are, ourselves as little disposed to speculate on the subject of cholera, as to yield implicit obedience to the dogmatic assertions of others; it may, nevertheless, not be uninteresting, and it cannot retard the acquisition of a more correct knowledge of the causation of cholera, if we briefly state those facts which seem to point to an indigenous rather than a foreign origin of the disease. This investigation will resolve itself, first, into an inquiry whether cholera be indeed an imported disease, the production of a hot climate, which, assuming all at once a migratory character, has, in the present century, for the first time, extended itself over a large portion of the habitable world; after which we propose to consider the general and local circumstances recorded in connexion with each visitation, with the object of determining how far its appearance has depended upon season, situation, or the local conditions of the people and their habitations. The opinion that cholera has come to us from abroad pre-supposes that the disease, in its epidemic form, is very different from the Cholera Morbus described by Sydenham as annually prevalent in the autumn in his time, and which continues to recur about the same period in ordinary seasons. There is, however, ample proof that this sporadic disease had both been more prevalent and more violent in the summer anterior to the appearance of cholera in October, 1831. In the eighth volume of the 'Medical Gazette' are reports of cases by Sir M. Tierney, Mr. Hingeston, and Mr. Fielding, which unquestionably assimilated very nearly to, if they were not identical with, epidemic cholera. Certain it is that several of these cases, if they had occurred during an epidemic visitation, would have been unhesitatingly referred to the pestilential variety by the most competent judges. In a note to the communication of the latter gentleman, his father, Mr. George Fielding, of Hull, states that he had, during forty years, occasionally seen cases of English cholera "which exhibited considerable collapse, and were without fœculent and almost colourless and inodorous excretions."* The appearance of cholera in Sunderland, in 1831, was preceded by an unusual prevalence of milder choleraic disease, which, according to Dr. Brown, passed by insensible gradations into the intenser form which produced so much alarm throughout the empire:

"Early in the month of August, cholera appeared, and speedily became very prevalent. It raged in all degrees of intensity, from slight bilious attacks to cases attended with violent spasms, coldness, collapse, almost (if not complete) arrest of the circulation, white discharges, suppression of urine, and, in short, all the symptoms ascribed by observers to the Asiatic and Continental diseases. Of these more intense cases, several were fatal, some of them within twelve hours."†

Evidence of a like nature is furnished by Dr. T. M. Greenhow in his account of cholera as it had recently appeared in the towns of Newcastle and Gateshead. He states that the first case of cholera which took place in that part of the country occurred on the 4th of August, 1831, at a village called Team, and that other cases occurred at Newcastle simultaneously with, if not before, the regular appearance of the disease at Sun-

* Medical Gazette, vol. viii. p. 817.

† Letter from Dr. Brown, of Sunderland, to Drs. Johnson and Tweedie: Medico-Chirurgical Review, Jan. 1831.

derland.* This direct evidence of the prevalence of disease of choleraic character anterior to the cholera epidemic of 1831, is much strengthened by an examination of the London bills of mortality. From these we learn that diarrhœa, summer cholera, and other diseases of a profluvious character, had been unusually fatal in several years of the present century—as, for example, in 1802 and 1803, and again in 1811, 1814, 1815, and 1823. The most striking circumstance on this head, however, is, that the mortality from the conjoined diseases of diarrhœa, dysentery, and flux, all of them congeners of cholera, suddenly rose in 1827, and progressively increased until 1831, in which year, in addition to an unusual number of deaths from diarrhœa and dysentery, 48 are recorded from cholera, although, according to the official documents, this disease did not reach the metropolis in its epidemic form until the month of February, 1832. It is true that the numbers recorded in each year are small in comparison with those we are now accustomed to, but the system of registration was at that period most imperfect, so that in all probability a large number of deaths were not recorded at all; moreover, the population of the metropolis in 1831 was much less than it has since become. A straw may nevertheless serve to show the direction of the current; and as diseases of the flux kind are precisely those which the unskilled are least likely to mistake, the fact here recorded would seem to indicate at least a disposition to analogous maladies, on the part of the inhabitants of London, anterior to the advent of the more formidable disease: at any rate, proof is thereby afforded that the mine was ready charged for explosion, and that, even if the spark which excited the epidemic outburst came from without, it found in the existing conditions of the population of Britain a congeniality for its reception. After the subsidence of the epidemic, the mortality from diseases of the alvine flux character never entirely receded within its former limits. In the year 1846, a marked increase occurred in the number of deaths from this class of complaints; the gross amount from each of the three diseases—summer cholera, diarrhœa, and dysentery—being considerably more than double that of any year since 1834. In 1847, the year preceding the second great visitation of cholera, the mortality from the same causes, although somewhat less than that in 1846, was still more than double the average of former years. In 1848, the deaths from cholera in London amounted to 652, of which 181 took place previous to the appearance of the epidemic disease in October. Some of these cases are said to have been nearly allied to the Asiatic form, to which they would certainly have been referred had the presence of epidemic cholera been at that time recognised in the metropolis.† A very careful inquiry into the history of the earliest cases of cholera which occurred in London, in the autumn of 1848, was made for the General Board of Health by Dr. Parkes, who reports, as the result of his scrutiny, that the poison could not have been brought by the clothes or baggage of any persons coming from infected districts in England; neither was there any evidence of the arrival of persons from the Continent,—from Hamburgh, or from Dantzic,—into the localities wherein the earliest cases occurred. Cholera and diarrhœa never retired within their former limits after the year 1849, but continued to

* T. M. Greenhow on Cholera in Newcastle and Gateshead. London, 1832. pp. 88, 126.

† Registrar-General's Report on Cholera, p. 12; also British and Foreign Medico-Chirurgical Review, vol. iv. p. 257.

occasion a very considerable annual mortality until the outbreak of the third great epidemic in 1853. The mortality of the summer quarter of 1853 was considerably below the average, a depression in which, with the exception of a few districts of Northumberland and Durham, nearly every county and district of England participated. "A similar depression of the mortality was observed in the summer quarter of 1848, immediately before the outbreak of the epidemic cholera;"* and was also noticed in Moscow during the summer of 1830, prior to the outbreak of cholera there in September.

The earliest cases of the epidemic took place in August; its appearance in London and in Newcastle, and other northern towns, being almost simultaneous. Before the end of the year, the pestilence appeared in Liverpool, Plymouth, Redruth, and other places remote from the scene of its first great explosion. A painstaking investigation into the history of the first cases in the vicinity of Newcastle, by Dr. Robinson, of that town, seems to show that the disease was not introduced by direct human intercourse; a result confirmed by the commissioners appointed to inquire into the outbreak, who state in their report that—

"There is no evidence whatever to show that the late outbreak in Newcastle was in any degree owing to the arrival there of any infected ships, sailors, or other persons, from any already-infected localities." (p. 25.)

Taken altogether, this evidence is opposed to the common opinion, that cholera is somehow directly imported by means of human intercourse. The isolated outbreaks which have occasionally happened at seasons when cholera was not generally epidemic, all tend in the same direction. Thus

"The House of Industry at Coventry suffered, in the beginning of 1838, a sudden and severe outbreak of cholera, when 55 of the inmates—27 males and 28 females—perished by the epidemic. The first death occurred on the 7th of January, and on that and the four following days 7 cases were fatal; from the 12th to the 16th inclusive, 4 persons died; between the 17th and 21st, 15; between the 22nd and 26th, 20; between the 27th and 31st, 7; and on the first three days of February, 2. 18 of the fatal cases occurred under forty years of age, and 8 between that and sixty; but the greatest mortality was between sixty and eighty years, when 20 patients sunk under the epidemic; the remaining 9 died at upwards of eighty years.

"Fortunately, the disease was confined to the house, and did not extend its visit to the town."†

There had been no case of cholera in Tynemouth, nor in any other place within a considerable distance, for several months, when, in the last week of March, 1849, four deaths occurred in a notoriously unhealthy court of that town, three of them in the same house. The survivors were removed, the house was cleansed, the pestilence ceased, and did not again raise its head in any part of the borough until the following month of July.

The foregoing facts certainly seem to show that the population of this country has been undergoing a morbid change, as regards the tendency to diseases of the flux character, during the second quarter of the present century. They are nevertheless not altogether incompatible either with the introduction theory, or with the opinion expressed by Dr. Farr, "that while the materials were smouldering in England, the flame which threw

* Registrar-General's Quarterly Return of Marriages, Births, and Deaths, No. 19.
† Registrar-General's Report on Cholera, p. 79.

the mass into combustion has been of Asiatic origin." However probable this might otherwise be, there are not wanting facts which would seem to show that, under a different name, cholera was one of the most fatal epidemics by which the population of London was formerly afflicted. We must here again revert to the evidence on this head furnished by the bills of mortality. An examination of these shows that there was a decided increase of dysenteric and diarrhœal disease for several years anterior to the Great Plague of 1665. In that disastrous year, over and above the mortality from plague, 1600 deaths are recorded from the diseases classed in the bills of mortality under the heads of "griping in the guts," "bloody flux," and "colick," all of which we are justified in referring to the general head of alvine flux by the example of Dr. W. Heberden, jun., whose investigations into the nature of the diseases recorded in the bills of mortality render him the first authority on this subject.

It is not unimportant to observe here, that bloody flux, or true dysentery, is always distinguished in the bills from flux and "griping of the guts," showing that a correct discrimination was exercised in regard to the two complaints. We learn from Willis the real character of the disease classed under the head of griping of the guts, which no one who has read it will hesitate to consider, if not identical with cholera, at least closely allied to it:

"Although," says he, "the word dysentery, in the common acceptation thereof, signifies a bloody flux, yet, saving the etymology, I shall apply that name to this London disease even when it is not at all bloody; for I have often, and a great while since, observed that there are two very different sorts of this same flux, which almost every year is wont to be so rife here about autumn, and is commonly called in our language the *griping of the guts*; in the one whereof the stools were watery, and, as it were, limpid (or clear), with a sudden weakening of the body; in the other they are bloody, but tolerable."

"In the year 1670, about the autumnal equinox, a great many were sick of an unbloody but a very sharp and dangerous dysentery. The distemper came upon them on a sudden, and oftentimes without any manifest cause, and reduced the patients—by grievous vomiting, frequent stools, and these watery ones—in a short time to very great weakness, horrid faintings of their spirits, and destruction of their strength. I know a great many that, though the day before they were well enough and very hearty, yet within twelve hours were so miserably cast down by the tyranny of this disease that they seemed ready to expire, in that their pulse was weak and slender, a cold sweat came upon them, and their breath was short and gasping; and indeed many of them . . . . died quickly of it. This distemper raged for a whole month, but began to decrease about the middle of October, and before the first of November was almost quite gone. Few at that time had bloody stools, and not many bilious ones, but a great many had both vomitings and evacuations that were waterish, almost limpid, and in great quantity."*

It is remarkable that Sydenham, who gives an account of the dysentery which prevailed in London from 1669 to 1672, makes no direct allusion to this disease so graphically described by Willis. Probably it may be, as Morgagni has surmised, that in so large and populous a city as London they met with a different phase of disease, consequent upon the different conditions of the atmosphere, and the variety in the occupations, habits, and residences of those affected;† an opinion which the concluding

* Willis, Pharmaceutice Rationalis, § iii. cap 3; also a translation by S. Pordage, p. 51. 1681.
† Alexander's Morgagni, book iii. letter 31, article 2. London, 1769.

remarks of Willis seem to justify, for, says he, "Whilst this common dysentery raged so severely within this city, there was scarce any one sick of it in the country, or at least above three miles off." Another point worthy of notice in reference to this London disease, is, that Sydenham says the dysentery of 1669—70 was preceded by diarrhœa, as if, "at that particular time, the atmospheric constitution was inclining towards the subsequent dysentery."*

Morton also speaks of epidemic diarrhœas and dysenteries, accompanied by "awful twitching cramps," as prevailing annually from 1666 to 1672 in the autumnal months (August, September, and October), to such an extent as to occasion a weekly mortality of from three to five hundred. The diarrhœa consisted of a copious purging of colliquative and virulent serum.†

It will not fail to be observed that, with the exception of Morton, whose account is much less like cholera than that of Willis, no mention is made of cramp or of the blue skin so frequently observed in severe cases of malignant cholera. These are, however, neither essential nor universal symptoms of cholera; and Bontius, in his account of the cholera in Batavia, written in 1629, and which is usually considered as having been identical with the so-called Asiatic cholera of more recent times, mentions neither spasms nor lividity. Sonnerat,‡ who gives a brief account of cholera in his 'Travels,' whilst he mentions the more prominent symptoms of watery flux, vomiting, extreme faintness, oppression of the chest, and suppression of urine, takes no notice of the cramps and lividity of the skin. Curtis, whose description of cholera is otherwise most excellent, whilst he speaks of a livid circle around the sunken eyes, and of the livid, incurvated condition of the finger nails, describes the countenance as pale, wan, and dejected. No doubt cholera, like every other epidemic disease, varies in its type, as it certainly does in severity; for if we consider it, and the diarrhœa so prevalent during an epidemic, as arising from the same cause, and being, in fact, the same disease in a different degree of intensity, there is as much variety in the aspect and symptoms of cholera as of scarlet fever, between the malignant cases of which and the extremely mild ones frequently encountered, there is so vast a difference as would infallibly mislead an unskilful or unobservant practitioner as to their identity.

Neither was this London disease confined to Britain, for the dysentery of Nimeguen, in 1736, described by Degner, in many respects resembled the cholera of modern times, and especially in the suppression of urine, the vomiting, failing, and sometimes entire deficiency of pulse, coldness of extremities, prostration of strength, and amount of purging. "One," says he, "can scarcely either conceive or believe the great amount of liquid humours passed in this disease. Almost the whole body is dissolved into liquid, and purged away by the intestines."§ Morgagni alludes to these watery dysenteries, or, as he elsewhere calls them, diarrhœas, and describes an attack which he himself suffered in 1733, in which, within twelve hours, he discharged at least sixteen pints of almost

* Greenhill's translation, vol. i. p. 122; published by the Sydenham Society.

† Morton, Pyretologia, appendix, p. 421. Londini, 1692.

‡ Sonnerat, Voyage aux Indes Orientales et à la Chine, fait par ordre de Louis XVI. Vol. i., pp 201—4.

§ Degnerus, Historia Medica de Dysenteria, etc., pp. 5, 14, 17, 18. 1738.

limpid water.* "The pains were slight: the stools not very frequent, but very large."

To return, however, to London. An examination of the bills of mortality shows a great increase of diseases of the flux family after the Great Plague of 1665, as if the conditions favourable to the development of glandular plague having ceased to exist, the pestilential elements still remaining among the people of London, found vent in a disease of different form. This mortality is chiefly assigned to the disease styled in the bills "griping in the guts," sometimes also called "the plague in the guts," between which, bloody flux, flux, and colick, a distinction is uniformly maintained. In the year immediately succeeding to that of the fire—by which event the population within the bills of mortality must have been greatly reduced—the number of deaths from this one form of flux exceeded two thousand. Below this it never fell until near the close of the century, although in some years it exceeded three thousand, and in one or two, four thousand. It must be remembered that the population of London at that date but little exceeded a fifth of the present amount. It was computed by King† at 530,000 in 1685, and is believed to have been very stationary, the loss by deaths, which greatly exceeded the births, being barely compensated by immigration from the country. Thus the comparative mortality from this single disease in ordinary seasons, equalled that occasioned by the cholera epidemic of 1854.

From the beginning of the eighteenth century the mortality from the several forms of alvine flux began to fall, and keeping pace with the improved habits and social position of the people, gradually all but ceased before its close. Dr. W. Heberden states, and we have verified his account, that the deaths from flux—which had, as we have seen, for many years annually exceeded two thousand—amounted to one thousand and upwards in the early part of the eighteenth century, had decreased to one hundred and fifty by the middle of the century, and at the close, to twenty.

From the foregoing facts it seems not improbable that the modern cholera is but the re-appearance of pestilential disease amongst us in a form familiar to our ancestors: the appearance, under a new and more formidable aspect, of a malady which has been known as a yearly autumnal visitor since the days of Sydenham. If so, the gradual cessation of this formidable disease during the last century, and the gradual augmentation of the mortality from analogous diseases for a few years antecedent to the first visitation of cholera, and, still more strikingly, both anterior and subsequent to that of 1849, would indicate corresponding variations in the sanitary condition or social habits of the people of England. It may be that the introduction of a leaven from abroad was necessary to call into active operation the slumbering elements of evil. It may be that a true zymosis has been excited in the vitiated atmosphere of our towns by the arrival here, wave after wave, of a ferment generated in the damp jungles and foul hovels of Hindostan. But it may be that the evil is of indigenous growth, and that the poison of cholera rather consists of

* Loc. cit. p. 71, article 9.

† King's Natural and Political Observations. 1696. See also the third chapter of Macaulay's History of England.

some peculiar chemical condition of home-bred elements, called into being by the gradual growth of new evils consequent upon the vast comparative extension of our town populations during this century. At present, neither supposition can be entirely and exclusively adopted without hesitation. The time has not even arrived when we can safely attempt the solution of the question. Let both aspects of the subject, therefore, be kept in remembrance; and so let us proceed to the study of any future epidemic visitation of cholera, should such unhappily occur.

As regards the view of the case here set forth, it may not improperly be objected that the local circumstances and general condition of the people varies comparatively but little from year to year, and that the insalubrious influences to which they are exposed are tolerably persistent. This is no doubt true, and we are bound to admit, and indeed our object is to show, that some other and occasional circumstance is required to give energy to them. This may consist in some climatic or seasonal condition, such as may have been meant by the term "Constitution of the Year," as used by the older physicians. Temperature would seem to have a large influence, for it is significant to observe how often the prevalence of alvine flux has varied with the fluctuations of the thermometer, both in the same and a succession of seasons. Applying this test to some of the years upon which we have already remarked, we learn that the average temperature of 1846, in which the mortality occasioned by diarrhœa, cholera, and dysentery, was very large, was four degrees higher than that of 1845, and three degrees above the average of the six preceding years. The mortality from these diseases in London, which had been 865 in 1845, reached 2536 in the hotter year.* The year 1847, although still warmer than the average, was inferior to that of 1846. This fall of average temperature was accompanied by a corresponding fall of mortality from these diseases, although dysentery was prevalent, and diarrhœa fatal. But it may again be objected, that seasons have always varied, and that there were many hot years during the century that England was free from alvine flux of pestilential character. True again; but the remark only proves that a hot season is no more sufficient to induce the outbreak of a pestilential epidemic than the local circumstances of the people were found to be. In other words, the local causes of insalubrity which have grown up amidst and around us, require the combined influence of a certain atmospheric condition to produce pestilence. This brings us to the second division of our subject, which we shall consider under the two heads of "seasonal or meteorological conditions," and "localizing causes."

Ample materials for this investigation are furnished by the very valuable and interesting reports of the Committee for Scientific Inquiries, appointed by the Medical Council of the General Board of Health in 1854, and by Dr. Barton's most elaborate report 'On the Sanitary Condition of New Orleans,' which occupies 250 pages of the report of the sanitary commission appointed to inquire into the recent fatal visitation of yellow fever to that city. Dr. Barton's report, which is unique, comprises the result of many years' careful observation and inquiry as a voluntary labourer in the field of sanitary investigation. It is well worthy of the highest commendation; and if duly appreciated by the authorities of New Orleans, will be the means of inaugurating a system of

medical inquiry and hygienic supervision in that city, notoriously one of the most pestilential in the United States, which cannot but eventuate in immense public benefit. Dr. Barton seems of opinion that epidemic diseases are usually the production of the locality in which they appear; and we presume he would assert that cholera is of indigenous origin, requiring only a certain season and certain local conditions for its development. Speaking of the cholera of 1853, he states that all the atmospheric conditions for its development existed, but that—

"New Orleans was in no condition to localize it. . . . . Whilst an epidemic state of the atmosphere exists over the whole country, the disease will only be developed where there exists also, in more or less intensity, the localizing conditions of filth, moisture, stagnant air, &c."

Referring to the two causes essential, according to his experience, for the production of epidemic pestilence, which he somewhat quaintly calls the "shears of fate," he distinguishes the terrene or localizing conditions as one blade of the shears, and the atmospheric or meteorological as the other. As regards the latter element, he finds that cholera has always existed in New Orleans with an east or south-east wind; a temperature above 70°, increased as the disease attained its maximum; a dew point of from 60° to 70°, and a barometric elevation of over 30°. The year 1853, in which cholera appeared—but, owing to the removal of localizing causes consequent upon the attempt to cleanse the city during the long previous scourge of yellow fever, did not reach any great height—was eminently distinguished by the unusual prevalence of calms or a stagnant state of the atmosphere. With the decline of the epidemic, the climatic states to which, in conjunction with local conditions, he refers it, also changed. The temperature fell, and the wind shifted. "The maximum barometer," he says, "occurred on November 18th, and was 30·16°, a very unusual height here; soon after which the cholera broke out." During December, the wind continued from the east, north, and north-east; the maximum barometer 30·48° on the 2nd, when the cholera was at its height, and declined to its minimum, 29·57°, on the 30th. The cholera ceased soon after the middle of the month. The average temperature fell from 65° in November to 53° in December. The subsidence of the cholera epidemic in 1832 was also most rapid, consequent upon a sudden fall of temperature, with north winds. This visitation, which was one of the most fatal on record, carried off 4340 persons, being at the rate of 78·78 per 1000 of the population. Like the much milder epidemic of 1853, it followed immediately in the train of a disastrous attack of yellow fever, which entirely disappeared a few days after the outbreak of the cholera which supplanted it. Dr. Barton attributes yellow fever and cholera to very similar terrene conditions, but to different atmospheric states; and says the co-existence of the two diseases is incompatible, and that they have never existed together as epidemics in New Orleans. In the year 1833, in which was the next most fatal visitation of cholera, the mortality occasioned by it exceeding 17 per 1000, there was—

"A great fall in the thermometer on the 8th of June (and of course the hygrometry); a heavy fall of rain on the 9th (over five inches), and severe thunder and lightning; a change of wind from south-east, which had predominated to the western quarter, and the disease gradually declined. It reached its acme on the 8th, and terminated about the 25th."

The first epidemic of cholera in this country, during the present century, began in the north of England, in October and November, 1831. The preceding summer was unusually fine, the harvest early, and the difference between the northern and southern counties of England, as to season and richness of vegetation, much less marked than usual. Mr. Losh, of Jesmond, near Newcastle-upon-Tyne, states that October was fine, and November milder than usual: "The nights have been warmer, in proportion, than the days; and though November is always a gloomy month, it has this year been more subject to a hazy state of the atmosphere than usual."* December, also, was much warmer, and the atmosphere singularly stagnant: "there was always a haze in the air." The month of January, 1832, was of unexampled warmth and dryness; and it was remarked by seamen and others accustomed to observe the weather, that there had been no brisk gale for above four months. Cholera began in Newcastle, early in December, 1831, with a south-east wind. The atmosphere of Newcastle and Gateshead during the epidemic outbreak in September and October, 1853, is described by Dr. Charlton and other witnesses, before the Cholera Inquiry Commissioners, as having been unusually still, stagnant, close, and hot. It was impossible to ventilate even large houses, in which no change of air "seemed to take place for almost a week together." The atmosphere was dark, and the temperature high.†

In Mr. Glaisher's report 'Upon the Meteorology of London in relation to the Cholera Epidemic of 1853-4,' printed in the appendix to the report of the Medical Council, he gives, as far as practicable, a comparative view of the meteorology of London during the three chief epidemics of 1832, 1849, and 1854. The report, to which we must refer for details, will well repay a careful perusal, and is advantageously read in conjunction with Dr. Barton's, to which we have already adverted. Mr. Glaisher, at the conclusion of his very minute and elaborate report, thus sums up the meteorological phenomena of the three visitations:

"In the year 1832, the barometer reading was high, that of the thermometer low;‡ and rain was deficient one-fourth of its average in the year. In the summer, when the disease was raging for the first time in England, the barometer was high; the temperature below the average; the quantity of rain small; the direction of the wind north-east and south-west; the air not in much motion; the sky partially overcast; and there was a seeming deficiency of electricity.

"In the year 1849, the pressure of the atmosphere was great; the temperature high; the sky overcast; the direction of the wind north-east and south-west; the atmosphere misty and thick; the velocity of the air less than one-half its average.

* Cholera in Newcastle, p. 91. By T. M. Greenhow. London, 1832.

† Since this article was in type, Mr. Thornhill, of the Newcastle Literary Society, has kindly favoured us with an abstract of the meteorological observations kept at that Institution for the autumnal quarter of 1853. The point most worthy of note is, that the barometer rose just as the disease reached its climax, and after continuing above 30° during the five most fatal days, gradually fell from the 20th to the 24th of September. The daily mortality declined from 111 on September 19th to 85 on the 20th, and had decreased to 56 on the 24th. The month of August was exceedingly dry. There was light rain on five days between August 26th and September 2nd, but very little after the last of these days until the epidemic had almost ceased. The first deaths were on September 1st. The mere height of the thermometer was not such as to account for the extremely oppressive closeness of the atmosphere described by several of the medical witnesses, and to the correctness of which we can bear personal testimony. The temperature never exceeded 68°, and only passed 64° on four occasions during the continuance of the epidemic.

‡ Mr. Glaisher elsewhere shows that the diurnal range of temperature was small in every month.

When the epidemic was at its height a calm prevailed, with a misty, thick atmosphere at all places, which was sensibly more dense and torpid in low places; the weather was dull, thick, and oppressive; no rain; temperature of the Thames above 60°; weak positive electricity; no electrical disturbances.

"In the year 1854, the pressure of the atmosphere was great; the temperature generally high; sky overcast; direction of the wind north-east and south-west; and the velocity of the air was less by one-half than its average for some time before; and at the time of the greatest mortality from cholera, the barometer reading was remarkably high, and the temperature above its average; a thick atmosphere, though at times clear, everywhere prevailed; weak positive electricity; no rain. In low places, a dense mist and stagnant air, with a temperature in excess; temperature of the Thames water high; a high night London temperature; a small daily range; an absence of ozone, and no electricity.

"The three epidemics were attended with a particular state of atmosphere, characterized by a prevalent mist—thin in high places, dense in low. During the height of the epidemic, in all cases the reading of the barometer was remarkably high, and the atmosphere thick. In 1849 and 1854, the temperature was above its average; and a total absence of rain, and a stillness of air, amounting almost to calm, accompanied the progress of the disease on each occasion. In places near the river, the night temperatures were high, with small diurnal range; a dense torpid mist, and air charged with the many impurities arising from the exhalations of the river and adjoining marshes; a deficiency of electricity; and, as shown in 1854, a total absence of ozone, most probably destroyed by the decomposition of the organic matter with which the air in these situations is strongly charged.

"In 1849 and 1854, the first decline of the disease was marked by a decrease in the readings of the barometer, and in the temperature of air and water. The air, which previously for a long time had continued calm, was succeeded by a strong south-west wind, which soon dissipated the former stagnant and poisonous atmosphere. In both periods, at the end of September, the temperature of the Thames fell below 60°; but in 1854, the barometer again increased, the air became again stagnant, and the decline of the disease was considerably checked. It continued, however, gradually to subside, although the months of November and December were nearly as misty as that of September." (pp. 116, 117.)

The chief results deducible from Mr. Glaisher's observations are, that in cholera years the meteorological conditions are such as have a marked tendency to favour the chemical decomposition of organic substances; "and to render the season defective in those atmospheric changes" which by decomposing or dispersing into space the products of decomposition, "renew the purity of the air." These evils are much aggravated by, indeed in some respects are due to, the extent of river surface and of undrained marshes in and around London; the vaporous exhalations arising from which, detained to a considerable extent by the still atmosphere and the hills which bound the metropolis on two sides, hang like a veil over London, obscuring the sun's rays during the day-time, and retarding the radiation of heat at night. This is especially applicable to times when the temperature of the river being higher than that of the circumjacent air, the former, which can be viewed only as the main common-sewer of London, is converted into a seething, simmering cauldron of foul impurities, the emanations from which consist, not simply of watery vapour, but contain also the products of this unwholesome decomposition. This is just the reverse of what would occur if the river were freed from its vile contaminations, for the water would then absorb and carry off some of the atmospheric impurities necessarily incidental to the existence on its margin of a densely-peopled city.

"The effect of temperature upon the Thames water, in tainting the surrounding air, is exhibited in the well-known fact that diarrhœa and summer cholera become prevalent after the temperature of the Thames has attained to 60°;"

as well as from the fact, "that as the water declines from this temperature, so also do the above diseases." In these facts, also, lies one of the causes why the population inhabiting the low alluvial lands near the margin of the Thames have in each epidemic suffered unduly from cholera. No doubt, a large share of the evil is due to the filth-saturated soil, the imperfect drainage, and, as we shall hereafter point out, the numerous local sources of atmospheric impurity; but these are all vastly aggravated by the greater stagnancy of the air, prevalence of haze, and excess of night temperature, with "small diurnal range," and the existence of an "air charged with the many impurities arising from the exhalations of the Thames."

No evidence of so precise and accurate a character as that furnished by Dr. Barton and Mr. Glaisher on the meteorology of cholera seasons, is procurable from any other source. Abundant matter corroborative of the same general facts and conclusions is, however, met with in Dr. Milroy's able and interesting report on cholera in Jamaica, and in several reports by medical officers of the Indian army. Cholera appeared in Jamaica in September, 1850; and although its main force was expended before the middle of the following year, it continued to linger in some of the inland districts until the commencement of 1852. During this period it destroyed upwards of a tenth part of the entire population of the island; the deaths being estimated by Dr. Milroy at between 40,000 and 50,000 at the least, and the population at about 400,000. Out of the 40,000 inhabitants of Kingston, about 5000 are reported to have succumbed to the pestilence. In smaller places the proportionate mortality was sometimes even larger. The little town of Port Maria, with its suburbs, Stennett's Town and Manning's Town, lost 553 persons out of a gross population of only 1000, of whom 200 are supposed to have fled immediately on the outbreak of the epidemic. In this unhappy island, then, cholera in its most virulent form prevailed with unexampled violence. It will be presently seen how very similar were the circumstances of the visitation to those which exist with the less violent manifestations of the same pestilence in our own more favoured climate. In reference to the meteorology antecedent to and during the epidemic, Dr. M'Illree, writing to Dr. Milroy from Newcastle barracks, says: "The weather at the commencement of the year was very dry;" "there was much heat in June, July, and August;" and "for several weeks previous to the appearance of cholera it was exceedingly warm, still, and disagreeable, even at Newcastle, which is nearly four thousand feet above the level of the sea." "The atmosphere was very oppressive, and surcharged with electricity." Mr. Taylor, of Good Hope, a plantation in the Port Royal mountains three thousand feet high, remarked, "that for several weeks not a breath of air was to be felt, nor a leaf seen to move, even at that elevation." Similar evidence is furnished from the north or opposite side of the island by the Hon. Mr. Roberts; from Port Royal by the military and naval medical staff; and by Drs. Clacher and Henderson, of Port Antonio. The weather in St. Elizabeth was intensely hot and oppressive for several

weeks before the outbreak: "the atmosphere felt as if it was too thick to breathe." Dr. Reid, of the 2nd West India Regiment, stationed in Spanish Town during the period, says in his report:

"I noticed that every day, for some time prior to the (epidemic) attack, about two o'clock the air became very sultry, and that immense masses of heavy-looking clouds, with very defined edges, hung over the town, and gave to every one a most unpleasant feeling of tightness across the chest. This, I think, continued for about a week before the epidemic broke out." (p. 118, note.)

The whole of the facts relative to the meteorology, so far as they came to his knowledge, are thus summed up by Dr. Milroy:

"After a very dry spring, the early rains set in as usual in May. In ordinary seasons these last for two or three weeks, and then dry weather follows for some months, when the late or October rains are looked for. But in 1850, rainy weather occurred at frequent intervals throughout the whole summer. It was altogether a very wet season, not so much from occasional immense falls of rain, as from the constant recurrence of showers; and also, which is not common in tropical countries, from their frequently occurring during the night. The heat, too, was more than usually oppressive from July onwards, in consequence of the remarkably calm, stagnant state of the atmosphere. The sea-breezes—which are so refreshing within the tropics, setting in about nine or ten o'clock in the morning, and lasting till the afternoon—frequently failed, or were entirely absent for several days in succession. At other times they were irregular as to the direction from which they came. The regular sea-breeze in Jamaica is from the east, being south-east on the south side, and north-east on the north side of the island. Whenever it deviates much from its accustomed quarter, blowing more due north or south, it becomes much less refreshing, and this change is the more remarkable if it veers round at all to the westward. It is then, instead of being the 'doctor,' or health-bringer, very generally not only uninvigorating, but positively unwholesome.

"Now the change in question was continually occurring during the summer and autumn of 1850. . . . . The peculiarities adverted to were experienced, not in one part only of the island, but over its entire length and breadth; on the coast and in the interior; on high mountains, which are usually cool and healthy, as well as in the plains, where oppressive sickly weather is more common." (pp. 7—8.)

In his account of an outbreak of cholera in H.M. 86th Regiment at Kurrachee, in India, in June, 1846, Mr. Thom mentions that—

"The climate of Kurrachee during the weeks preceding the appearance of cholera among the troops was characterized by several peculiarities different from those which generally belong to all hot countries and seasons, perhaps mainly so by their presence being in an excessive degree. First, the temperature was unusually high, being 90° to 92° in the day-time, and 86° at night in good houses; and in the tents of our soldiers it rose to 96°, 98°, and 101°, as indicated by a thermometer suspended on a central pole five feet from the ground, and in the thorough draught between the doors. Secondly, the quantity of moisture in the atmosphere was greater than I ever saw it before in any part of the world, or at any season, the dew point being at 83°, and the thermometer in the shade at 90°, the lowest range; even this gives 12·19 grains of vapour in each cubic foot of air. The mean heat in the twenty-four hours was such as to suspend an unusually large proportion of vapour in the air, always near, but rarely or never reaching the point of deposition. Even at the Equator, with the sun overhead, I never saw the point of deposition above 78°. The third, and perhaps most important, circumstance worthy of notice in connexion with the other two, was the light, weak, unsteady winds or calms which prevailed in the early part of June. Now this is exactly the reverse of what ordinarily happens. In the last two years, the months of June and July were remarkable for the strong, steady, and cool winds,

and overcast sky, which has given so favourable a character to the climate of Kurrachee during the hot months. It also appears that the quantity of rain which fell during the prevalence of cholera was much beyond anything that had occurred for a long time before; at least it surprised the European officers who have been here for three or four years. The state of the barometer I cannot give, but it must have been very low."*

The effect of this state of the weather upon the bodily feelings and functions is described as having been most overpowering and oppressive.

"There was a sense of languor and oppression, a stifling feeling about the respiration, and inability to undergo the slightest fatigue without extreme exhaustion. . . . . In fact, for ten days before the predictions were unhappily fulfilled, it was a common remark among 'old hands' that it was regular 'cholera weather.' . . . . At this moment (14th October) the thermometer is as high as it was during the cholera,-being 90° to 92° in houses, and 100° in tents, in the middle of the day; yet we feel fresh, elastic, and free from that horrible undefinable sense of oppression that prevailed in June. . . . . But we have a palpable cause of this agreeable change; the dew point is at 72° instead of 83°, and the evaporation is now, even in a calm, more rapid than it was in a fresh breeze in June."

From the meteorological table we learn that after some days of cloudy hot weather it became oppressive and calm, or with but little light wind, on June 11th. This state of things continuing, after six admissions for cholera on the preceding days, there were 47 on the 15th, and 316 in the six following days, 209 of which were on the 16th and 17th. On the afternoon of the 17th the wind, which had previously been south-west, veered to the north-west, there was a fresh breeze, and the pestilence began to decline. On the 21st there was heavy rain, with squalls at night, and the admissions, which had on that day been 20, fell on the following day, in the morning of which there was a gale. The disease, in fact, ceased as an epidemic, the subsequent cases being straggling ones. Out of 1091 rank and file, 410 were attacked by, and 238 died of, the disease between June 11th and July 20th, being at the frightful rate of upwards of 218 in the 1000. This is exclusive of the other troops in garrison, natives as well as Europeans, and of officers, women, and children.

Although, according to Mr. Scot, cholera has been doubly more frequent in India in dry than in wet weather, and usually begins to manifest itself in April and May, at the setting in of the hot season, many instances are recorded of its having followed rain, and a change from an exalted to a lower state of the thermometer. It is not difficult to reconcile these facts with its more usual prevalence in dry weather; for in situations in tropical countries naturally dry, there is in very hot and dry weather an absence of the degree of moisture indispensable for its production, which a fall of rain supplies, but of which there is always enough without rain in moister climates, like England, and in marshy districts, or by the margins of rivers. This is in accordance with the history of that other pestilence, plague, between the history of which and that of cholera there are so many striking analogies. The Arabian physicians assert that pestilences are brought by unseasonable moistures, heats, and

* Medical Report on the Causes, Character, and Treatment of Spasmodic Cholera in H.M. 86th Regiment at Kurrachee, in June, 1846, pp. 13, 14. (Parliamentary Paper.)

the absence of atmospherical movement. In Ethiopia it is particularly observed that rain during the sultry heats of July and August is usually followed by plague. On the other hand, plague often ceases with a rise of temperature, provided there be an absence of moisture.* Cholera often prevailed in India with an east and north-east wind. At Arcot it appeared on the day on which the wind changed from south-west to the north-east, or monsoon quarter, and considerably abated on the occurrence of a strong south-west gale with rain.† At Vizagapatam it appeared about the 13th of May. The weather was oppressively hot, and the air loaded with humidity. Cholera broke out in its most aggravated form in the 2nd Madras European Light Infantry, at Arnee, on May 23rd, 1840. The weather had previously been intensely hot, the thermometer during the month having varied from 80° to 93°. At two P.M. on May 22nd, the day preceding the outbreak, a heavy squall of wind, with rain, occurred, reducing the temperature from 91° to 87° in the house, and to 81° outside. Twenty patients were admitted into hospital between the evening of the 23rd and the following morning, and the disease continued to prevail with more or less violence until the end of the month. After very sultry weather, the station was refreshed with heavy rain on the evening of the 31st and June 1st, when cholera disappeared as suddenly as it arose.‡ "Cholera was not prevailing in the neighbourhood, and no one was supposed to have arrived amongst the troops from an infected place." Another of the Indian medical officers reports, that at the time of and anterior to an outbreak of cholera "there was a dead stillness in the atmosphere, not a twig nor a blade of grass moved, and many complained of a suffocating sensation. On the 18th, between two and nine A.M., 31 cases of cholera were admitted," and 11 more during the day, making in all 42 out of a strength of 617.§ Dr. French, of H.M. 49th Regiment, in reporting upon an outbreak of cholera in that regiment in February, 1835, after stating that on the occurrence of a high wind, accompanied by a fall of temperature, the disease abated, and the cases became more controllable, adds—"It has frequently come under my observation in India, that violent storms of wind and rain have for a time either entirely arrested or greatly mitigated all the symptoms of the disease."|| Bellary, a military station in India, is notorious for the liability of the troops stationed there to cholera. Between 1818 and 1839, the year 1819 alone shows no mortality from this cause. The average strength of the European troops has been 654, and the average admission of cases of cholera into hospital 39, being at the rate of about 6 per cent., of which nearly a third have proved fatal. The climate of Bellary is characterized by an intense heat, a cloudless sky, great glare, with strong gusty hot winds during the day, and considerable reduction of temperature at night. Very little rain falls in that part of India. The rock of Bellary is of granite, five hundred feet high, and the soil immediately around is formed of the granitic débris. On at least one occasion of an

* Mead on Plague: Mead's Medical Works, pp. 247, 259. London, 1762. 4to.
† Report on Epidemic Cholera, p. 9. By W. Scot.
‡ Reports on Asiatic Cholera in Regiments in the Madras Army from 1828 to 1844, pp. 10, 184. By J. Rogers, F.R.C.S. London 1848.
§ Loc. cit., p. 205. || Loc. cit., p. 115.

epidemic outbreak at Bellary, of which a record has been preserved, this was preceded by light showers of rain following great heat.*

The cloudy sky so frequently observed to prevail during cholera visitations in this climate is not without its parallel in India. Mr. Scot thus describes it:—

"Amongst the atmospheric phenomena supposed to be connected with the appearance of cholera in India, it may be interesting to mention a certain aspect of the sky which proved too often to be a harbinger of an outbreak. This was a dull leaden-coloured suffusion, obscuring the sun, yet totally without any distinct form of cloud—an ominous canopy, without motion, and attended with a certain chilly feel in the air. If this continued for several days, we were certain to hear of cholera, and the disease would cease on this appearance of the sky breaking up, especially if ending in a storm."†

The report on the cholera in the Black Sea fleet is a very interesting document, and well illustrates the effect of a close, still atmosphere, and of defective ventilation, whether this arise from the structure of streets and houses, or from the position of a ship, in favouring the disease. In several vessels the mortality was considerable; it was pre-eminently so on board the *Britannia*, *Albion*, and *Trafalgar*. Cholera broke out simultaneously among the crews of these vessels on August 9th, when moored off Baljick. The preceding days "were oppressively hot, and a dead calm generally prevailed throughout the bay." The thermometer on board the *Trafalgar* averaged 75°, the barometer 29° 87′, from the 1st to the 8th of August. On the evening of the latter day, the wind, which had previously been south, and partly off land, shifted, and blew a very hot blast from the shore, over the encampment lately occupied by the French. Upwards of one-half the crew of the *Britannia* suffered either from diarrhœa or cholera between August 9th and 27th, of whom 139 died. The ship quitted Baljick on the morning of the 12th. As she drew out of the bay, she got the advantage of the prevailing north-east breeze, and on that day and the following the patients did well. On the night of the 13th, the wind freshened, rendering the closure of the lower-deck ports necessary, and the only ventilation between decks was by the "imperfect means" of wind-sails. The great outbreak commenced about ten A.M. on the following morning, and "for the suddenness of its advent, the tempest-violence with which it raged, and the wreck it left behind," was almost unprecedented. The deaths on the 14th and four following days were—13, 45, 21, 14, and 14. On the 17th, the ship returned to port, and the greater part of the crew, sick and healthy, were transferred into empty transports, from which time the disease rapidly abated. It is perhaps not unworthy of note, that some of the officers and seamen have since spoken of a peculiar dense cloud which passed over this ship and the *Albion* on the 13th.

As the result of our inquiry into the meteorological circumstances that precede or accompany outbreaks of cholera, it would appear that whilst this pestilence may prevail within a considerable range of temperature, a moderately elevated one is most suitable for its development; and this

* Reports on Asiatic Cholera, p. 14. By J. Rogers, F.R.C.S.
† Report on Epidemic Cholera as it has appeared in the Presidency of Fort St. George, p. xviii. By W. Scot. 1849.

accompanied by a still, stagnant condition of the atmosphere, and a moderate amount of moisture.

It may be objected to this view, that cholera prevailed during the winter months of 1831 in the north of England, and at Moscow during the winter of 1830-1. Mr. Losh's 'Meteorological Journal,' already quoted, proves the winter of 1831 to have been of exceptional character in the neighbourhood of Newcastle where the pestilence first appeared. The summer of 1830 was oppressively hot in Russia, and cholera appeared in Moscow in September, whilst the city was still under the influence of the preceding heat. Its continuance during the cold of winter is probably more apparent than real, for the internal atmosphere of Russian houses is maintained at a high elevation during the winter months by means of stoves.

The precise effect of the comparative absence of ozone and of electrical disturbances in this country during an epidemic is at present unknown, as well as that of the high state of the barometer. It is certain that thunder storms have in this climate usually been succeeded by at least a temporary lull in the ravages of cholera; but, on the other hand, this disease is said to have been often heralded in tropical countries by disturbance of the atmospheric electricity. This was certainly the case at Quebec, towards the close of the epidemic there in the summer of 1832, but whilst the mortality continued large. Although the weather was hot and dry, there was an abundance of lightning every evening for ten days together. The frequent occurrence of mist and of a cloudy sky during a choleraic visitation is remarkable, especially as it has been observed elsewhere as well as in London. Mr. Glaisher, indeed, says "he can by sight estimate certain differences of mist, which he identifies with corresponding differences of epidemic sanitary condition; that he can connect one tint of mist with the prevalence of cholera, another with the prevalence of influenza; yet that, except for this rude test of colour, he cannot discriminate those mists, and has no hygrometric or other meteorological knowledge of their existence."

It is not unworthy of note here, how often mist has been observed to accompany pestilence. The first outbreak of sweating sickness in England was ushered in by a damp, misty atmosphere; and a similar history attaches to most of the subsequent visitations. The last epidemic of this disease, which broke out in April, 1551, was, according to Caius, preceded by impenetrable fogs of bad odour, arising from the banks of the Severn, from whence a true impestation of the atmosphere was diffused in every direction, so that whithersoever the winds wafted the stinking mist, the inhabitants were attacked by the pestilence.* Something not unlike the meteorological conditions observed in years of cholera outbreak was observed in the last plague year, 1665. J. Bell, in his 'London Remembrancer,' thus expresses his opinion relative to the influence of the season, and thus indirectly tells us the kind of weather prevalent during that momentous year:

"And I conceive that the contagion of the air doth arise from the unseasonableness of the weather; for the weather hath been very seldom since the begin-

* Hecker's Epidemics of the Middle Ages, translated by Dr. Babington for the Sydenham Society, pp. 290, 291, et seq.

ning of the plague suitable to the season of the year; but the air hath been close and obnumbulated, insomuch that the sun hath not had power to do its office, which is to exhale all fogs and malign vapours."*

There is one result of Mr. Glaisher's investigations to which we have scarcely alluded, but which well shows the importance of making careful meteorological observations in more than one locality of each district. It appears that during the autumn of 1854 a very great diversity of temperature was found to exist between the outlying and central stations of London; and this especially in regard to the daily range, which is much less in the city itself than the suburbs; much less near the river's margin than in more distant or more elevated localities. The excess of night temperature affected the weekly mean between particular stations to 7°, 8°, 9°, and 10°; and even for a brief period, to 15° and 20°. With the whole of these facts before us, we feel that Mr. Glaisher is fully justified in asserting that "were the meteorology of our towns carefully ascertained, and collated with that of the metropolis, and both together with that of the country generally," we should soon "be in a condition to elucidate a clear insight into the meteorological causes of cholera, influenza, and many phases of disease which now burst upon us with the suddenness and devastating power of a divine and wrathful visitation."

It would thus seem that there was much justice in the opinion of the older physicians relative to the influence exercised by what they termed the constitution of the year in the causation of epidemic diseases. Perhaps the climatic conditions which have been so commonly found associated with cholera epidemics, and which, so far as we are able to gather from the meagre records furnished by contemporary authorities, were likewise associated with the several pestilences now extinct in this country, might justly be termed the pestilential constitution. Further observation is required before we can safely assign to this constitution its due share in the production of pestilence, but we are almost justified in asserting that the existence, in more or less intensity, of these seasonal and meteorological conditions is necessary for the development of pestilence in this climate, whether in the form of cholera or of plague, although the co-existence of at least one other factor is likewise necessary. In other words, a certain distemperature of season favours, if it is not necessary for, the production of pestilence, the precise character of which will depend upon the existence of some social or local condition, without the co-operation of which an epidemic pestilence cannot arise. Many circumstances seem to strengthen this supposition. Amongst others, the unusual amount of mortality in London from the several kinds of alvine flux in the year of the last plague at Marseilles, which very considerably exceeded the average of the seven preceding and the seven following years; as though the same character of season which had given strength to the plague at Marseilles, exhibited itself here in a less deadly form by the increase of the only disease approximating to a pestilence then existing in this country. The absence of plague from Britain since the great plague of 1665, and its disappearance from Egypt for upwards of one

* London's Remembrancer; or, a true Account of every particular week's Christenings and Mortality in all the years of Pestilence, &c. By John Bell, Clerk to the Company of Parish Clerks. 1665.

thousand one hundred years during the Persian, Grecian, and Roman occupation, together with its re-appearance in the latter country at a subsequent period, both point to the existence of some local conditions as necessary for its production. The many analogies between the history of plague and cholera also tend to show that they are in some respects governed by similar laws, although the proximate cause of each must be different. Both have prevailed chiefly in the same season of the year, and in similar localities. The greatest prevalence and mortality of both has usually been in September, and it has commonly happened with both that each visitation has extended over two seasons. The same districts of London in which plague was most destructive, are those in which cholera has been most fatal. A still more striking analogy was the occurrence of sporadic cases of plague almost annually, just as in our time is the case with cholera; so that, although there were then, as now, many years in which the number of deaths from pestilence, being inconsiderable, were not set down as epidemic seasons, yet scarcely one passed over in which at least a few scattered deaths from plague in the hotter months are not recorded.*

That meteorological conditions have a great influence over the development and spread of cholera, no one who has followed us throughout this investigation will hesitate to admit. How important is it, then, that the inquiries set on foot in 1854, and then only when the pestilence had attained its acme, should be systematically continued;—that the climatic phenomena of different towns be compared, a careful register of disease, as well as of mortality, be instituted, and a comparison of the meteorological phenomena of districts and towns visited by the same classes of disease be made;—lastly, that the atmospheric, electrical, and thermometric phenomena of those parts of towns which are found to be notoriously insalubrious be placed in juxtaposition with those of the suburbs and healthier portions of the same. Care should be especially bestowed upon an investigation into the presence or absence of ozone, our knowledge of which has not extended in proportion to the valuable results which, from the little we know, may be expected to flow from an increased acquaintance with its properties and effects.

Hitherto meteorological inquiries have been made almost exclusively with a view to the discovery of the laws which regulate the weather and climatic character of seasons. The results obtained from the limited and partial inquiries of last year in the direction of meteorology as applied to the investigation of epidemic disease, are so important; the promises of still more valuable information as regards the causation of disease held out by meteorology, if these inquiries be pushed into the normal as well as the unusual influences of season, so large, that we cannot resist expressing a confident hope that some system will be adopted for their continuance. Soon there will be a skilled staff of inquirers into the local sanitary condition of London, who might combine meteorological with medical and sanitary inquiries. By a slight change of plan, the

* Those years in which 1000 deaths did not occur were not esteemed plague years. Maitland declares in his History of London, that for twenty-five years before the fire of 1666, the city had never been clear of plague. From 1603 to 1679, the bills of mortality only exhibit three years entirely free.

valuable records kept by the medical officers of districts under the poor law, which, so far as we know, have not hitherto been made available for the prosecution of either statistical or medical investigations, might supply information in regard to the prevalent kinds of sickness, and their comparative mortality, similar to that now furnished by the Registrar-General as regards death. Probably an arrangement might be made to obtain similar information from public hospitals, dispensaries, and other large institutions. From a careful classification of such facts, placed side by side with the meteorological phenomena of the time and place in which they have been observed, we should gradually obtain a more precise knowledge of the effects of weather, season, and climate upon the human constitution. The effect of weather on the human constitution is a common topic of conversation in this changeable climate of ours. It is by common consent allowed to be great, yet we absolutely possess no accurate acquaintance with the result produced on man's organization by a rise or fall of the barometer or thermometer, or the electrical state of the atmosphere.

We have thus investigated, as fully as the information within our reach would admit, the influence of season in the production of cholera. The presence of another co-efficient, at least, is, however, necessary to give character and energy to this influence. This, as we have before said, is to be sought in the existence of certain occasional, and therefore remediable, conditions, which by common consent are termed localizing causes. This constitutes what Dr. Barton has termed "the other blade of the shears." Whether this common opinion be true, and if so, what is the real nature of such localizing causes, we must leave to be determined on a future occasion.

E. Headlam Greenhow.

Review II.

Guy's Hospital Reports. Third Series. Vol. I. — *London*, 1855. pp. 381.

It is with much pleasure that we have received the first volume of a new series of the 'Guy's Hospital Reports.' These reports are essentially what hospital reports ought to be, and what the present state of medicine requires—viz., a series of carefully observed and recorded facts. Notwithstanding that the original contributors to the Reports "have been sadly reduced in number," we would congratulate the editors on the merits of the present volume, and would assure our readers that it fully maintains the high character which its predecessors had earned for it.

We proceed to give an analysis of the various papers, which amount to twenty:—

I. We have first a paper by Dr. W. W. Gull, entitled *Notes on Tænia, with fifty Cases, treated by the Oil of Male Fern.*—This indigenous plant, the *Lastræa Filix mas* of modern botanists, has been known as a vermifuge since the days of Dioscorides. About five-and-twenty years ago its efficacy was confirmed by Peschier, of Geneva, in several hundred cases; but it does not appear to have attracted much attention in this country until noticed by Dr. Christison in the 'Edinburgh Monthly Journal' for

1852. In the following year a paper appeared by Dr. Christison in that journal, giving the results of his experience in upwards of twenty cases, in all of which, without exception, the worm was discharged after a single dose. Dr. Gull's cases amply confirm the previous statements of Peschier and Dr. Christison, and show that an indigenous weed equals, if it does not surpass in efficacy as a vermifuge, the vaunted kousso of Abyssinia, the turpentine of America, or the pomegranate of the Continent. The preparation employed was the ethereal tincture of the rhizome, in doses of from one and a half to two drachms,* in a mucilaginous draught, occasionally followed by a saline laxative; which last, however, Dr. Gull does not consider necessary. In all Dr. Gull's 50 cases, as well as in many others treated by his colleagues, the remedy proved effectual. One patient had been labouring under tapeworm for eleven years, and had taken kousso six times. In 25, or one-half of the cases, we find the period mentioned which intervened between the administration of the drug and the expulsion of the worm. The average of all the cases was five hours and three-fifths. In 8 out of 20 cases the head of the worm was found. There can be no doubt, then, of the efficacy of the male fern as an anthelminthic; but we still want information as regards the permanence of the cure which it effects. In 5 only of Dr. Gull's cases are we informed that the cure was permanent, whereas in 6 cases we are told that the worm returned within a short period.

With regard to the locality in which the patients lived, all came from low-lying districts on the south banks of the Thames. As to sex, 27 were females, 14 males, and 9 doubtful, but probably females; this would make 36 females to 14 males. As to age, 11 were under ten years, 6 from ten to twenty, 14 from twenty to thirty, 11 from thirty to forty, and 8 above forty.

II. Dr. W. Gull records an interesting case of *Atrophic Softening of the Brain*, dependent upon occlusion of the innominata and left carotid arteries where they came off from the arch of the aorta. The origin of these vessels was quite obliterated by a fibrous structure, and the arch of the aorta was thickened and dilated. These morbid conditions appeared to have originated in an attack of aortitis, brought on by violent muscular exertion, nearly two years before death. During life, the patient, a female, aged forty-one, had had two apoplectic seizures; the first, shortly after the commencement of her illness, being followed by hemiplegia on the left side, and the second proving fatal. Extensive recent softening was found in the anterior and middle lobes of the left hemisphere, and the right corpus striatum was much wasted, and contained two irregular cysts.

The case is full of interest, as showing the production of cerebral softening from a want of due nutrition. Softening dependent upon disease of the arteries at the base of the brain is very common, but in this case the arteries at the base were "everywhere free from atheromatous deposit." The case is also interesting from the fact, that for upwards of a year the left subclavian artery appears to have been the only trunk which maintained the circulation in the head and neck and both upper

* The dose appears large. In Dr. Christison's cases it did not exceed twenty-four grains.

extremities. It would have been very desirable to have ascertained the sources of the collateral circulation.

III. *Researches on the Nature of the normal Destruction of Sugar in the Animal System.* By W. F. Pavy, M.D.—The sources of sugar in the circulation are now generally admitted to be twofold:—1. The saccharine matter originally contained in the food, or which has been formed by the action of the saliva and pancreatic juice upon its amylaceous constituents, is directly absorbed by the lacteals; and 2. The researches of M. Claude Bernard have shown that the liver possesses the power of forming sugar by chemical processes in its circulation, even when the food is destitute of both starch and sugar. The sugar from both these sources is conveyed to the right side of the heart—in the former case, by the thoracic duct and superior vena cava, and in the latter, by the hepatic veins and inferior cava. Dr. Pavy records the results of a number of experiments upon animals, which he performed in order to ascertain the place and manner in which the saccharine matter thus thrown into the circulation is destroyed. As to the place, he confirms the observations of previous experimenters, that the lungs are the chief seat of destruction of saccharine matter in the animal economy, though the process is also carried on in the systemic capillaries, especially those of the chylopoietic viscera. As to the manner, he combats the combustion theory of Liebig and other chemists, according to which the sugar is resolved, by the direct action of the oxygen absorbed during respiration, into water and carbonic acid; he endeavours to show that it becomes converted into lactic acid by the catalytic action of an azotized principle whose particles are in a state of change—viz., the fibrine of the blood.

This conclusion he supports by the following facts and arguments:—1. He found, by repeated experiments, that during the aëration of blood which contained sugar, and still retained its fibrine, the sugar largely disappeared; whilst in blood that had separated from its fibrine, and lost its vitality, no such destruction of sugar was observed. 2. Sugar, in its ordinary chemical bearings, manifests little susceptibility of direct oxidation, while it is with extreme facility metamorphosed when in contact with an azotized principle whose particles are in a state of change, becoming converted into lactic acid. 3. Lactic acid is shown to exist in arterial blood by the fact, that the former is separated from it by the follicles of the stomach and the muscular tissue. 4. It is well known that the presence of an acid will check the lactic acid fermentation; and Dr. Pavy ascertained, that by injecting diluted phosphoric acid into the jugular veins, so as to overcome the normal alkalinity of the blood, the metamorphosis of the sugar ceased to be accomplished as before. 5. Dr. Pavy notes a fact, also observed by Bernard, that if blood containing sugar be allowed to decompose, the sugar disappears, and the blood becomes acid.

IV. *On the Treatment of Purulent Ophthalmia, with Cases.* By J. F. France.—In this paper, Mr. France records the history of 9 cases, and gives the result of his treatment in 20 more. The cases varied in their nature, some being dependent on gonorrhœa, others on exposure

to cold and wet, &c. The object of the paper is to show, first, "that this disease, left to its natural course, imperils in the very highest degree the faculty of vision;" and second, that "up to a given period it admits of remedy, and is divested of danger, by the plan of treatment adopted." The following is a summary of the treatment recommended. 1. In acute cases, local depletion by leeches, and scarifying the inner surfaces of the eyelids every twenty-four hours; also scarification of the ocular conjunctiva, where there is much chemosis. 2. The repeated application between the eyelids of a collyrium of nitrate of silver, containing from 1½ to 8 grains to the ounce. 3. Constant fomentation and ablution with decoction of poppies, containing a drachm of alum dissolved in each pint. 4. When there is much chemosis, after a purgative, calomel, until the chemosis is subdued, or the mouth begins to be affected. 5. Quinine, when there is debility. 6. Moderately nutritious diet. 7. During convalescence, a tonic diet and regimen, with local astringents and counter-irritants. A tabular view is given of the various cases, from which it appears that of thirty-six eyes subjected to the above treatment, four were lost, one remained under treatment, and thirty-one were saved, retaining perfect vision.

V. Mr. France also records a *Case of Pulsating Swelling in the Orbit*, which originated from a thrust with the point of an umbrella. The swelling appeared to be aneurismal in its nature, and is remarkable for having subsided spontaneously after some months, the only treatment adopted being quietude, and attention to the general health.

VI. Mr. France also mentions three cases of *Sub-conjunctival Dislocation of the Crystalline Lens.*—In one, the dislocation was inwards; in another, upwards; and in a third, outwards.

VII. *Cases selected from the Records of the Lying-in Charity of Guy's Hospital, with Remarks.* By Dr. J. C. W. Lever.—Of these, we would merely mention two cases of ovarian dropsy. In one, ovariotomy was performed, but, owing to the existence of adhesions, whose presence had not been expected, the whole of the cyst could not be removed, and the patient died of peritonitis thirty-nine hours after the operation. In the other case, after paracentesis had been performed three times, death took place from rupture of one of the cysts, and consequent peritonitis. In this case, though formidable adhesions had been expected, those which were found were very slight, and easily broken up by the finger. These two cases indicate the great difficulty of diagnosing the existence of adhesions in the case of ovarian tumours—a difficulty which, as urged by the late Dr. Hamilton, of Edinburgh, must always constitute an objection to the operation.

VIII. *Cases illustrating the Pathology of the Stomach.* By S. O. Habershon, M.D.—These cases, twenty-nine in number, are referred to the following pathological conditions:—atrophy of the mucous membrane, catarrh, superficial ulceration, follicular ulceration, chronic ulceration, perforating ulcer, diphtheritic inflammation, suppuration in the coats of

the stomach, sloughing of the mucous membrane, and cancer. The subject of the pathological conditions of the mucous membrane of the stomach is one which is only beginning to attract the attention which it deserves, and which will amply repay such investigations as those of Dr. Habershon.

We cannot, however, avoid thinking that Dr. Habershon's numerous divisions are somewhat premature, and hardly justified by the present state of our knowledge. Thus Dr. Habershon himself admits that each of the various forms of ulcer which he describes may terminate in perforation, and hence we are led to the belief that some of the forms may be merely different stages of the same morbid condition. Dr. Habershon states, that he has repeatedly observed appearances similar to those described by Dr. Handfield Jones, as produced by atrophy and hypertrophy of the solitary glands of the stomach, and the development of cysts, but seems to think that these changes may often be produced by the mode of making the preparation, or by changes after death. Dr. Habershon also doubts the explanation given by Dr. Jones of the appearance of mammillation—viz., that it is produced by local atrophy of the mucous membrane, or the breaking up of the hypertrophied solitary glands, on the grounds that mammillation is more common than the existence or evidence of solitary glands, and that the appearance may be often produced artificially in a healthy mucous membrane. He does not appear to be aware that Dr. Jones has described two forms of mammillation, one of which "may be called healthy, and appears to depend on some unusual contraction of the corium of the mucous membrane."* There is one statement of Dr. Habershon's which requires confirmation, and as to which we must in the mean time express our doubts—viz., that "the sympathetic nerve may be observed in microscopical sections, at the base of the mucous membrane, sometimes *upon the capillary vessels*, and at other times leaving them." Dr. Habershon has some interesting observations on fatty degeneration of the stomach, in which the follicles are found to contain only granules of oil, in place of secreting cells. The symptoms in these cases he has found to be "a sense of great prostration and exhaustion, with complete loss of appetite, the tongue clean, no pain, nor thirst, nor vomiting." Case 17 is an interesting one of fæcal abscess, which established a communication between the greater curvature of the stomach and the transverse colon, and also with the right pleura. It is to be regretted that the symptoms are not given, and more especially that it is not stated whether or not there was fæcal vomiting, or vomiting of food during life, or what was the condition of the pylorus. Dr. Gairdner's observations of cases in which there was a communication between the stomach and transverse colon, would lead to the belief that fæcal vomiting is to be looked for chiefly in those instances in which the pyloric orifice is free, and vomiting of food, when there is some constriction of the pylorus.†

Dr. Habershon seems to think that we may derive some assistance in the diagnosis between chronic ulcer of the stomach and cancerous disease,

* Dr. C. H. Jones, Observations of Morbid Changes of the Mucous Membrane of the Stomach, p. 8.

† Edinburgh Medical Journal, p. 80. July, 1855.

from the age of the patient. The average age of six cases of the former was thirty-two years, that of five of the latter, fifty.

IX. *Adenocele* forms the subject of a very interesting and important paper by Mr. BIRKETT. Since the Jacksonian prize of the Royal College of Surgeons was awarded to Mr. Birkett in 1848, for his essay on 'Diseases of the Breast,' he has been regarded, and most deservedly, an authority in these matters. Under the head of "adenocele," our author includes those tumours of the mamma which contain structures similar to, if not identical with, the normal secreting tissue of the gland, and more especially the cysto-sarcoma and chronic mammary tumours of surgical authors. M. Lebert,* of Paris, and Mr. Birkett, were the first to show by the microscope that these tumours, besides resembling the mammary tissue in general appearance, contained elementary tissues precisely similar; and we ourselves, as well as other observers, have had frequent opportunity of confirming the correctness of their observations. Recent researches have shown that the same law holds good in the case of tumours developed in the substance or neighbourhood of other glands, more especially the thyroid, salivary, and prostatic glands.† The fact that a new morbid deposit in the body should assume the complicated structure of glandular tissue, is one of high interest to the physiologist, as showing the great influence which the tissues themselves exercise over the nature of the materials separated from the blood, and the forms which these materials assume. Mr. Birkett makes three divisions of adenocele. In the first, he classes those new growths which are dense, firm, fibrous, and lobulated, and which correspond to the "chronic mammary tumours" of Sir A. Cooper. In the second, he includes those cystoid formations in the mamma, having growths within them, which appear to spring from their walls—the "cysto-sarcoma" of Müller; and to the third division he refers those cystoid formations first pointed out by Sir B. C. Brodie, as referable to a dilatation of portions of some of the lactiferous tubes. Of the first two classes he makes numerous subdivisions, according as the tumours contain the glandular ducts, sinuses, and secretion, or merely the cæcal terminations of the ducts, or according as these are united or not by connective tissue, &c. Now, while admitting the correctness and importance of Mr. Birkett's observations, we doubt if much advantage is to be derived from such a systematic classification; and we would venture to suggest that the three classes of adenocele, or at all events the two first, may be merely different stages in the development of one and the same tumour; or in other words, that the same tumour, examined at different stages of its growth, might present the characters of each of the classes. A simple cyst arising from dilatation of one of the lactiferous ducts, or more frequently from a transformation of some of the elementary tissues of the gland, may have glandular growths developed from its lining membrane, so as to constitute an example of the second class; and again, these glandular growths increasing in size more rapidly than their containing cyst, ultimately fill this, and come to belong to the first class—viz., a solid glandular tumour, enveloped by a fibro-cellular capsule. We have our-

* Physiologie Pathologique, tom. ii. p. 201.

† Paget's Lectures on Surgical Pathology, vol. ii. pp. 8, 263, 264, et seq.

selves had occasion to examine specimens, apparently exhibiting these three stages in one tumour, and our opinion is further confirmed by two of the cases recorded by Mr. Birkett, in which there was an "alternation of the so-called chronic mammary tumour and the cysto-sarcoma in the same individual, and at different periods of life."

Mr. Birkett also makes some interesting observations on the age and social condition of the patients in whom these tumours are developed, as also on the prognosis, diagnosis, and necessity for operation in such cases, for which we must refer the reader to the original paper.

X. *Two Cases of Chronic Inversion of the Uterus, successfully Removed by Ligature.* By HENRY OLDHAM, M.D.—In the one case, the inversion followed a first parturition, and the inverted portion, which comprised the whole of the body of the organ, was removed, nearly six years after, by means of the ligature. The ligature separated on the twenty-second day, and a fortnight after the patient was able to leave the hospital. In the other case, the ligature was applied for the removal of a fibrous polypus, which was afterwards found to have dragged along with it a considerable portion of the uterus. The tumour, including the portion of the uterus, was cut away on the twentieth day, and a fortnight after the patient left the hospital, recovered.

Dr. Oldham makes some valuable observations concerning the causes of inversion of the uterus, and endeavours to disprove the common opinion that it arises from a mismanagement of the third stage of labour, by traction of the placenta, still adherent to a flaccid, yielding uterus. He mentions that, out of 16,000 cases of labour attended by the *pupils* of Guy's Hospital, not a single case of inversion had occurred; and in the only instance of inversion following parturition which he had himself met with, traction of the placenta had certainly not been the cause. He is disposed to ascribe the first direction inwards of the uterus to an irregular contraction of its fibres, the remaining part of the inversion being completed by contraction of the non-inverted part or the bulging inverted portion, "which it grasps, and extrudes as a foreign body."

XI. *Lacerated Perinæum: Operation, nine days after Delivery.* By HENRY OLDHAM, M.D.—In this case, the operation was performed in the manner recommended by Mr. I. B. Brown, and was attended with perfect success. It does not appear, however, that the sphincter ani was divided, as recommended by Mr. Brown.

XII. *Cases of Tracheotomy; with Observations.* By THOMAS CALLAWAY.—The author records three instances in which he performed the operation of tracheotomy in infants not exceeding three years of age. In three of the cases, the operation was performed on account of suffocation following the swallowing of scalding liquids from the mouth of a tea-pot or tea-kettle. These cases, occurring within a period of twelve months, show that this accident is by no means unfrequent. Two of the cases recovered; one died. In the remaining case, the operation was performed on account of suffocation produced by impaction of a portion of food in the œsophagus, compressing the trachea, the gullet itself being compressed

and narrowed by a scrofulous tumour of the vertebræ. This case terminated fatally.

XIII. *On the Intrinsic Calcification of the Permanent Tooth-pulp, as constantly associated with Dental Caries.* By S. JAMES A. SALTER, M.D. —Calcification of the tooth-pulp, Dr. Salter states he has found, after numerous examinations, constantly associated with dental caries. The calcification he describes as commencing in the centre of the tooth-pulp, near the extremity of the fang, by the development of minute calcareous nodules, which he designates "calcification islands," and in which he has not been able to make out either laminæ, tubes, or other histological forms. These islands increase in size and number until they become fused together into one calcified mass of "osteo-dentine," consisting of systems of dentine around isolated bloodvessels. The surface of the pulp nearest the decayed portion of the tooth is the last to calcify, and it is on this fact that Dr. Salter principally founds his distinction of the change which he has described, from the "dentine of repair," as described by Mr. Tomes, in which the dentine is developed on the exposed surface of the tooth-pulp by outgrowths of the superficial vessels. Dr. Salter also shows that, in some cases, the tooth-pulp is converted into *crusta petrosa;* and that, in such cases, there has generally been a preternaturally abundant communication between the tooth-pulp and periosteum. We have next—

XIV. *A Digest of Two Hundred and Nine additional Cases of Chorea, occurring in the Hospital.* By H. M. HUGHES, M.D., and E. BURTON BROWN.—In a previous volume of the 'Guy's Hospital Reports' (1846, p. 360), Dr. Hughes gave a similar digest of 100 cases of chorea. We shall enumerate a few of the more important results deducible from the 309 cases of the combined Reports.

1. As to the *age* of the patients; we find—

85 cases did not exceed ten years.
137 cases were above ten and up to fifteen (inclusive).
65 cases were above fifteen and up to twenty (inclusive).
11 cases were above twenty.
In 11 cases the age was not stated.

2. As regards the *sex*, 241 of the cases, or almost 78 per cent., were females, and only 68, or 22 per cent., males. Curiously enough, however, under the age of nine years the proportion was very different—viz., 15 females to 12 males, or only 5 to 4; a fact which is also shown by the tables given by Romberg, in his work 'On Nervous Diseases.'

3. The *exciting cause* was determined in only 143 of the cases; of these—

In 87 cases the cause was fright.
12 " " injuries to the head.
13 " " rheumatism.
10 " " uterine affections.
2 " " avowed masturbation.
8 " " debility.
11 " " other diseases.

It is to be observed, that though rheumatism is mentioned as the exciting cause in only 13 cases, in very many instances it is stated to have previously existed. Thus, of 58 cases in which this was made a special subject of inquiry, it was found to have existed in 30, not to have existed in 28; and out of 104 cases in which special inquiries were made respecting rheumatism or the existence of a cardiac murmur, there were only 15 cases in which the patients were both free from the cardiac murmur and had not suffered from a previous attack of rheumatism.

4. As regards the *extent of the body* over which the choreic movements occurred, we find this specially referred to in 103 cases of the last Report:

In 42 cases they were general, or all over the body.			
7	cases they were limited to both arms or upper part of body.		
30	„	„	right side of body.
24	„	„	left side of body.

It appears that when chorea affects the whole body, a longer time is necessary to effect a cure, and that it is more frequently fatal than when it affects one side only. Dr. Hughes, indeed, observes, that he has never witnessed a case of chorea prove fatal in which the whole body was not affected.

5. As regards the *results* in both Reports, we find—

201	cases noted as cured.		
30	„	„	relieved.
9	„	„	unrelieved.
10	„	„	died (2 of other complaints).
In 59 result not known.			

6. Of the cases which were cured, the average *duration*, from the commencement of the treatment up to the period when the cure was effected, we find to be a fraction above five weeks.

7. *Treatment.*—Various remedies were employed, such as sulphate of zinc, iron, syrup of the iodide of zinc, mercury, lemon juice, &c.; but the one most generally employed, and the most successful, was the sulphate of zinc. Electricity was employed in 14 cases, of which 5 were cured, 1 was relieved, 3 were unrelieved, and in 5 the result was not stated.

8. *Fatal cases.*—Of the 309 cases mentioned in both Reports, 10 proved fatal. In addition to these, 8 other fatal cases are mentioned in the first Report as having occurred in Guy's Hospital; making in all 18 cases. Of these, excluding three children, 9 were females, and 6 males. In two of the fatal cases, death resulted from other diseases during the chorea; of the 16 remaining cases, 12 were those of persons verging on puberty, or who had actually passed that period. The duration of the disease in the fatal cases was in one only six days; and exceeds ten weeks only in one instance, in which it was eight years.

9. *Post-mortem appearances.*—14 of the fatal cases were examined after death. In 10 cases, disease of some kind was observed within the

cranium, such as congestion of the membranes, or sub-arachnoid effusions, or increased vascularity with softening of the cerebral substance. No particular notice is taken of the cerebellum. In 4 cases the brain and its membranes were quite healthy. In 6 cases the spinal cord was examined, and was found healthy in 2, softened in 2, and either it or its membranes otherwise diseased in 4. Of 14 cases in which the chest was examined, in 11 there existed a diseased condition of the sigmoid or auriculo-ventricular valves, and in 6 or 7 of these cases the disease consisted of vegetations upon the valves.

XV. Mr. Edward Cock next details 13 cases of Fracture of both Bones of the Leg, and 7 of Dislocations of the Ankle, *in which it appeared expedient to divide the tendo-Achillis, for the purpose of replacing the separated bones and retaining them in position.*—These cases occurred at Guy's Hospital, partly under his own care and partly under that of Mr. Poland and Mr. Birkett, and this treatment appears to have been adopted since the publication of two cases by Mr. De Morgan in 1850, in which it had been first employed. Few surgeons, we believe, have met with cases in which such an expedient appeared necessary, yet we can conceive that a case might sometimes occur in which division of the tendo-Achillis would facilitate reduction. We are, however, rather surprised that at one hospital it was found necessary to have recourse to such a procedure twenty times in the course of four years, and we cannot but consider such a practice as evincing somewhat of *nimia diligentia* on the part of the surgeon.

Mr. Edward Cock also records—

XVI. *Rare Cases of Fracture and Dislocation.*—Of these, four in number, perhaps the most interesting is one in which there was dislocation of the head of the humerus into the axilla, with fracture through the neck of the bone. The patient was a man, aged forty-two, who had fallen from a considerable height, and pitched on to his right shoulder. This accident is noticed by Chelius, and three cases have been recorded by Sir A. Cooper, and one by Mr. Aston Key. In Mr. Cock's case, as in all the others, it was found impossible to effect the reduction of the head of the bone, and the case was treated so as to encourage the formation of an artificial joint between the broken end of the shaft and the glenoid cavity.

XVII. *Observations on Reinsch's Test for Arsenic.* By W. Odling, M.B.—These observations are of value, and tend to increase the already good opinion in which Reinsch's test for arsenic is held by British toxicologists. As regards the *delicacy* of the test, Mr. Rainey's observations had previously shown that by means of it $\frac{1}{1000}$th part of a grain of arsenious acid might be detected in solution; but Dr. Odling has succeeded with Reinsch's test in positively determining the presence of $\frac{1}{5000}$th part of a grain. Dr. Odling next proceeds to observe, that the objection which has been raised to Reinsch's test, that during ebullition a portion of the arsenic is lost, is one of no value; for, though a loss does take place, he shows, by an ingenious experiment, that when the quantity

of arsenic is small this is quite inappreciable. Lastly, Dr. Odling has found that the tersulphuret of arsenic is not, as it is always represented, quite insoluble in diluted hydrochloric acid, but quite the reverse, and that therefore Reinsch's test is equally applicable for the detection of this form of the metal. He has also ascertained that, provided oxidizing agents, such as nitre and chlorate of potass, or the perchloride of iron, be not present in large quantity, Reinsch's test is applicable to the detection of arsenic when in the state of arsenic acid.

XVIII. *On the Pathology and Treatment of Alkaline Conditions of the Urine.* By G. Owen Rees, M.D., F.R.S.—This paper is of great interest, both in a scientific and practical point of view, and coming from Dr. Rees, merits the attentive consideration of the profession. Ten years ago,* Dr. Rees had expressed his doubts as to the existence of the "phosphatic diathesis" of Dr. Prout; and he now adds, that his further experience is quite opposed to the belief that alkaline urine, except when produced by diet or medicines, is ever secreted as such by the kidneys; but that he believes that the urine secreted of a healthy acid character becomes alkaline from disease of the mucous surfaces over which it has to pass. Dr. Rees well observes, that a deposit of earthy phosphates in alkaline urine by no means indicates an excess of earthy salts, as may be proved by precipitating the portion which remains dissolved in the urine, and adding it to that already formed. A real excess of phosphates in the urine he has only found in cases of mollities ossium, in scrofulous and rickety children, and in some rare forms of dyspepsia. He supports his views by some important observations on the actions of alkaline remedies: "If the urine," he remarks, "be secreted of alkaline reaction, owing to the administration of alkaline remedies, there is no tendency whatever to deposit of phosphates." Again, he has found that, in cases of the so-called "phosphatic diathesis," an *alkaline* plan of treatment "answers excellently, and is the surest method of obtaining the secretion of an acid urine." By this, he says, the urine is rendered alkaline as it is secreted by the kidney, and less irritating to the inflamed mucous surfaces; and, as the patient convalesces and the alkaline remedies are gradually discontinued, the urine is discharged from the urethra of its healthy acid character. With regard to the fact that, in these cases, *acid* remedies are sometimes productive of benefit, Dr. Rees observes that, in the slighter cases, they may be so by improving the general health; while, at the same time, as they do not increase the acidity of the urine secreted, they do not render it more irritating. In many cases, however, he has found an alkaline treatment restore the healthy acidity of the urine, after the exhibition of mineral acids had completely failed. One remarkable case is adduced, to show the efficacy of alkaline remedies in cases of alkaline urine depositing phosphates. With regard to the form of alkaline treatment he has employed in such cases, he observes:

"When it is desirable to render the secreted urine alkaline, the best and most speedy mode of effecting the purpose consists in the exhibition of neutral salts composed of vegetable acids (the citric and tartaric), in combination with an alkaline base." (page 307.)

* On the Analysis of the Blood and Urine, second edition, p. 133. 1845.

XIX. *Report of all the Cases of Fever which occurred in Guy's Hospital during the Year* 1854, *with Remarks having especial Reference to the Typhus and Typhoid Distinctions.* By SAMUEL WILKS, M.D.—In the last volume of the 'Guy's Hospital Reports,' a similar report for the latter half of 1853 was published by Dr. Wilks. Putting these two Reports together, we find in all 249 cases of fever, which are classified thus:

Febricula	73 cases.
Typhus (26 with eruption, 29 with none)	55 „
Typhoid (91 eruption, 25 none)	116 „
Cases of fever which had cholera	5 „
	249

Dr. Wilks's observations bear out, in a most unequivocal manner, Dr. Jenner's distinctions of continued fever into the typhus and typhoid forms. In all the cases (91) which presented a well-marked rose-coloured eruption, diarrhœa was an urgent symptom; and in those cases which proved fatal, there was found to be ulceration of Peyer's patches in the small intestine; while in 25 cases of fever with diarrhœa, in which there was no eruption, the symptoms in every other respect followed the same type. On the other hand, of the 26 cases which presented the mulberry rash of typhus, in none was there urgent diarrhœa; and in none which proved fatal was there found any disease of the small intestines. Speaking of the characters of the eruption in the two forms of fever, he remarks:

"The clear skin with the pink spots scattered over it, in the typhoid form, and the mottled skin of the typhus, are generally sufficiently distinct. How the two can be confounded in the majority of instances, I cannot well imagine." (page 343.)

With regard to the difference in the duration of the fever, he says, as a rule, typhus "comes to an end on the thirteenth or fourteenth day;" whereas in typhoid fever "it is never until the expiration of three weeks that a change is observed." As to the intercommunicability of the two forms, he observes: "In these instances, where it has been known that other members of a household have had fever, and its nature discovered, it has invariably been of the same character as that of the patient admitted to the hospital."

Dr. Wilks mentions an instance in which four members of one family were attacked with typhus. One of these was a girl, aged eleven years, in whom we might more naturally have expected typhoid fever, according to the theory of those who maintain that there is but one poison, and that the age of the patient and other extraneous causes determine whether the typhus or typhoid form is developed. Dr. Wilks's observations, as we have said, confirm in every respect the views of Dr. Jenner, which are now supported by most members of the profession who have had opportunities of judging of the differences between the two forms of fever. We have lastly—

XX. *Miscellaneous Cases.*—Of these the most remarkable are two cases by Dr. Wilks, in which there was an excess of white corpuscles in the blood, in connexion with enlargement of the spleen, and which are illustrations of the disease originally described by Virchow under the name of

'leukhæmia,* and afterwards by Dr. Hughes Bennett under that of leucocythæmia. Dr. Wilks had examined the blood of upwards of fifty anæmic patients suffering from scurvy, purpura, &c., as also in twelve cases of ague, with enlarged spleen, without finding the proportion of white corpuscles abnormally increased.

Dr. Gull relates a case of strumous disease of the mesenteric glands, in which the oily ingredients of the food, such as cod-liver oil, passed through the intestines but little changed.

Review III.

1. *Lehrbuch der Pathologischen Anatomie.* Von Carl Rokitansky, &c., &c. Dritte umgearbeitete Auflage. 1ter Band, enthaltend Allgemeine Pathologische Anatomie und Anomalien des Blutes.—*Wien,* 1855. (Mit 130 Holzschnitten.)

   A Manual of Pathological Anatomy. By Carl Rokitansky, &c., &c. Third edition, completely revised. Vol. 1, containing General Pathological Anatomy and Abnormal Conditions of the Blood.—*Vienna,* 1855. (130 woodcuts.)

2. *A Manual of General Pathological Anatomy.* Translated from the German by W. E. Swaine, M.D., F.R.C.P., &c. Vol. 1. Sydenham Society, 1854.

3. *Rudiments of Pathological Histology.* By Carl Wedl, M.D., &c. With 172 illustrations on wood. Translated and edited for the Sydenham Society by George Busk, F.R.S.—*London,* 1855.

4. *Handbuch der Allgemeinen Pathologischen Anatomie.* Von Dr. August Foerster, Professor an der Universitaet zu Goettingen. Vol. II.—*Leipzig,* 1855.

   Manual of General Pathological Anatomy. By Dr. August Foerster, Professor in the University of Goettingen.

5. *A Manual of Pathological Anatomy.* By C. Handfield Jones, M.B., F.R.S., and E. H. Sieveking, M.D.—*London,* 1854.

The volume placed at the head of the works above-named is the first of the volumes which form Rokitansky's laborious work 'On Pathological Anatomy.' Though the first volume, it was published the last of the series; and naturally enough, for the antecedently published volumes, as the author himself tells us, furnish the groundwork of the views propounded in it. The general conclusions on pathology here brought together are, in truth, to be considered as the summary of the particular facts detailed in the volumes which treat of Special Pathology.

A new edition—a third edition—of this volume has just been published at Vienna, and appears most ill-naturedly almost at the same moment in which the translation of the *first* edition of it is presented to the English reader by the Sydenham Society, under the auspices of Dr. Swaine. This first edition was published in 1846, and thus, in an English form, comes under our notice simultaneously with the newly-revised

* Virchow and Reinhard's Archiv, p. 570. 1847.

edition of the original work published in 1855. The council of the Sydenham Society are in no way blameable for this unpleasant *contretemps*. The council, encouraged, Dr. Swaine tells us, by the author himself, did not hesitate to defer from year to year the publication of the first volume, until they felt that it would be improper to tax the patience of the members any further. They therefore published a translation of the edition of 1846 in January, 1855; and in February, 1855, appears from Rokitansky's hands the long-expected renovated volume in a third edition, and in a new form.

This present volume necessarily differs, Rokitansky says in his few lines of preface, essentially from the former one, for the reason that many important facts have been added to pathology since the publication of the former edition. In this volume his main endeavour has been to confine himself strictly to a detail of facts, and thereby to render the book a practical guide for the student of pathological anatomy.

Here, therefore, we may consider that we shall find detailed the present views and opinions of German pathologists, expressed by the most celebrated among them, on the matters comprised under the head of General Pathology. Some of these views and opinions, thus shaped and modelled by the light of fresh researches and better observation, we shall take the present occasion of bringing before our readers, and somewhat in detail. A condensed account of the facts of general pathology, as most newly propounded by the Viennese school, would, we believe, prove instructive and useful, especially to those who have not the opportunity of studying them in their original dress.

We owe a debt of gratitude to our German brethren in this matter of pathology. With their names, in an especial manner, must be associated the rapid progress which has of late years marked this branch of medical knowledge. Their schools have been the chief workshops, the sources, from whence have been furnished the facts on which rest our modern ideas of pathological anatomy. Nobody, we fancy, will dispute the claims of our Teutonic brothers to such credit; but if a questioner should trouble us for our proofs, we will reply by simply asking him what were the sources whence he derived his knowledge on the subject; and where is the list of *our* standard works on pathological anatomy?

Hence, then, in bringing the subject of pathology before our readers, we do so, and naturally, in connexion chiefly with the names of Rokitansky and of other of his countrymen. The importance of the study, and its direct practical application to therapeutics, have been fully recognised here; and everywhere around us we see the fruits of pathological observation daily ripening and accumulating, through the unwearied energy of numerous inquirers. We need say no one word as to the value of the study. A knowledge of the diseased conditions of the different organs and parts of the human body, as they present themselves to the observer after death and during life, is so manifestly necessary to him who would practise the art of medicine with advantage to his patient and with satisfaction to himself, that it would be mere waste of time to enlarge upon these advantages. When the student has acquired a certain knowledge in different branches of medical science, the necessity of gaining a knowledge in this also is, as it were, forced upon him. At the

bed-side of the patient he will have learnt, that for the scientific application of remedies, accuracy in diagnosis is indispensable; and that for accuracy of diagnosis, a knowledge of the morbid changes which accompany or result from disease, is equally so. His accuracy in diagnosis will, in fact, be measured by the constancy with which he compares signs and symptoms of disease observed during life, with facts revealed by the scalpel after death.

And then, again, how can he treat disease more creditably than the mere empiric, unless he have clear and succinct ideas as to the nature of the disease, against which he would employ his art? and how can he ever arrive at any knowledge concerning the nature of disease, except through the study of pathology? Sooner or later he will inevitably discover, that he who is not a pathologist can never be a physician. Let him recollect, that the works of Auenbrugger and Laennec were essentially founded on the results of pathological investigations; and that no medical knowledge (in its highest sense) has a foundation which is not based on such.

What is pathology? What is pathological anatomy? They are not the same things, though often used by us to express the same idea. Pathological anatomy stands in the same relation to pathology, that anatomy holds in reference to physiology; it is the foundation of the physiology of disease. And this will at once show us that pathology is something more than a mere description of the deviations of the organs and parts of the body from their condition of health; something beyond a mere study of the physical facts presented to us in morbid alterations of dead structures. Pathology is to be learnt during life, as well as after death; its study must commence at the bed-side of the patient, and must go hand in hand with clinical medicine. Its final object is to discover the disease, and so assist us in applying the remedy. Well: and here at the bed-side we may often, by observation of disturbances in functions manifested during life, arrive at pathological facts of which anatomy, after death, tells us absolutely nothing.

There are many diseases, in truth, of whose pathology we know nothing, excepting what we learn of it through disturbances of function manifested during life. What, for example, do we know of the pathology of tetanus, or of hydrophobia, or we may even say of that large class of diseases which has, yet with insufficient reasons, been classed under the head of blood diseases? what do we know of these beyond what we learn of them through the disorders of function by which they are characterized during life? Again and again has the most scrupulous sagacity sought in every part of the body for some explanation of the symptoms which represent those disorders in life; but anatomy, aided by the microscope and chemistry, has told us nothing to the purpose concerning them. Hence, then, all we know of the pathology of such disorders is derived from what we have observed during life; and therefore let it be well understood, pathology is a knowledge of disordered functions, as well as of dead anatomical facts.

But pathology, in its full sense, is even still more than this. It takes cognizance of diseases which lie dormant in the body, and which are not yet manifested either by disorder of function or by change of structure.

The diseases, for instance, which we call hereditary, while dormant in the individual who is the subject of them, are of this class; in such there must be some invisible taint, so to speak, inherent in their constitutions, and inherent from the first moment that the germ within the womb commenced its evolutions. The periods, again, of the incubation of diseases are pathological periods in the life of the individual affected by them. Though neither disordered symptoms nor structural changes, appreciable during those periods, indicate the existence of disease, still reason tells us disease is there, quietly working, gradually unfolding, and coming to maturity and complete development.

It may, perhaps, not be out of place at the present moment to express this word of caution, as to the proper signification which the student should attach to the word pathology; at this moment, when we are all so keenly engaged in the observation and recording of material facts. Thus occupied, we are naturally inclined to forget that pathological anatomy has but limited information to give us concerning the nature of disease; that in reality neither the scalpel, nor the microscope, nor chemical re-agents, can open to us the whole domain of pathology. We must strictly understand that observation thus aided can reach only a certain point, that it cannot embrace the whole; for, as we have said, reason steps in, and tells us there are diseases, or deranged conditions of organs, which totally elude our present powers of observation. The facts thus afforded us by reason are manifestly parts of pathology, but of pathology where neither the sight nor the touch can take cognizance.

Pathology, then, is the study of anatomical changes of organization; of the disorders of functions; and of latent and hidden diseases, and diseased conditions of the body. Through its aid we endeavour to trace out the nature of disease.

And what is the meaning which we are to attach to that word, disease? A correct answer to this question is of every importance to the practitioner of medicine, and we may therefore be permitted to dwell upon the matter for a moment; we say advisedly, to the practitioner of medicine, for what, after all, is the last and final object of these pathological studies, but the cure of disease? How poor and indifferent they become in value, stripped of their special purpose! What avails a knowledge of the study, if it come not to use practically in the physician's hand?

What, then, is disease? Now, there is no one fact of greater importance, inasmuch as it bears immediately on the treatment of disease, which has resulted from modern pathological researches, than this—viz., that local changes of structure are, in the very great majority of instances, where they become the proper subjects of medical observation, connected with some general disorder of the whole system; the structural alteration not being essentially the disease, but only one, and as it were the partial expression of some widely extended influence, some poisoning of the blood—to use the language of metaphor—some deranged state of the nervous centres, some faultiness in the nutritive powers, some depraved condition of the absorbing or secreting forces. The further our knowledge of pathology advances, the more clearly does the fact become established. The local accidents which represent the disease to us are not *the disease;*

we may study, and must study, as pathologists, the individual peculiarities and characters of these accidents: we must learn all that anatomy and chemistry can tell us of them; but then, as physicians, we should remember how little, in almost all cases, these accidents constitute the real disease which is afflicting or destroying the body. The ulcerated intestines and the spots on the skin in fever; the abnormal deposits found in the lungs in phthisis; the watery evacuations and the blue skin in cholera; the livid ecchymoses of purpura; the coma of uræmic disease; the pustules of small-pox—these are not the diseases; they are positively neither more nor less than its consequences; the sequents of certain antecedents whose essential nature eludes our grasp. They are not, therefore, the special objects of our treatment; our efforts are employed in the endeavour to neutralize the causes which produce them.

Now, of these morbid changes of parts, pathological anatomy gives us clear and succinct ideas; it tells us, truly, but a part of their entire history, but it defines accurately what it tells us, and marks clearly the line where our knowledge ceases: it brings us to a certain point in the history of the diseases of which they are the representatives, and there it leaves us; it shows us structural changes, abnormal conditions, and diseased products. But why these structural changes, why these abnormal conditions, why these diseased products, it tells us not, or it tells us very darkly. It shows us where our knowledge is safe and certain, it tells us where the history is complicated with doubts and difficulties, and lets us see clearly enough where it is shrouded in complete mystery. And it is just this very knowledge of his own ignorance which distinguishes the philosophic physician from the barren empiric.

We linger on this subject, for a clear comprehension of it, as before said, intimately affects the fulfilment of our last and highest duties as physicians—the treatment of disease; and, moreover, the very nature of pathological studies naturally inclines us too much to absorb our attention in investigations of the diseased product, and so to forget that the product is in reality the mere representative of the disease, and not the disease itself. Tubercular deposits, for instance, we may examine with the utmost care,—all their physical and chemical relations thoroughly make ourselves masters of; but when we have done all this, what, as physicians, have we learnt of the ultimate nature of the cause which provokes the deposit? what thereby have we learnt which shall guide us to a correct method of its treatment? This we have done: we have made ourselves masters of the method of the *development* of the disease at a particular stage of its progress, but we learn thereby nothing of the action which presides over the development and production of the abnormal deposit.

No; he who would know such a history of tubercle as shall avail him in his practical art, must look for his knowledge not here alone, in the minute details of its pathological anatomy, but in the whole history of the disease likewise, as manifested by symptoms in the living, and by reasonings on its hereditary and other special characters. This entire history of it is, indeed, its true pathology.

But let us not be misunderstood. In all we have here said we have not implied anything to undervalue the importance of pathological ana-

tomy. What we desire is to give the study its real and true value as an aid to the knowledge of the physician's art. It is, in truth, the only sure stepping-stone we possess to a right understanding of the treatment of diseases. It enables us, by appeals to material facts, to correct the erroneous views which fancy engenders; it gives us a solid basis whereon to establish a path of observation by which we may reasonably hope to arrive at their better comprehension. And from pathology also has arisen the physical diagnosis of internal diseases; that method of diagnosis by which we have been enabled to attain an unhoped-for degree of certainty in our discrimination of those diseases.

What we desire is to see its proper and legitimate value given to the facts of pathology, and that this value should neither be undervalued nor unfairly exalted. No one can pretend, as we have said, to the title of physician who is not conversant with structural diseases; but, on the other hand, the most intimate knowledge of structural diseases will of itself never make a man a physician. Pathology must be the chief means which shall direct us to a correct treatment of disease, and it will do so by telling us *how much* we know of disease. Where our knowledge of disease, of its intimate, its original nature is dark and obscure, there will our treatment be experimental, empirical, and doubtful; this useful lesson an enlightened pathology alone could teach us.

And indeed it is not hard so to turn the facts which pathology places to our hand, as to misuse them; rather it is difficult to restrain ourselves from putting them to unfit purposes. In our natural eagerness to seize upon any rational semblance of an aid which may help us in the cure of disease, how often do we fix our hopes on things that fail us. Every page of the history of medicine has something to teach us on this score; and the tale may be told perhaps of to-day, as we might tell it of the days of Broussais. Let the reader recal to his mind the modern history of blood diseases (so-called). A few years ago, and humoral pathology was paramount; in the blood existed, was to be sought, and would be found, the disease which by symptoms was demonstrating its presence in the body; animal chemistry would declare all this to us. Well, and how stands the matter now that time and experience have tested the value of this modern humorism? What are the facts which it has added to our intimate acquaintance with disease?

On this head we eagerly turned for information to that part of Rokitansky's new volume which should teach of the *Dyscrasiæ;* and, to our surprise, sought in vain for that painfully familiar term. Can we doubt that he has acted wisely and judiciously in thus ceasing to define by special terms hypothetical conditions of the body?

No one can deny, or refuse to admit, that, associated with certain diseases, particular alterations occur both in the quantitative and qualitative relations of the constituents of the blood; but surely there is nothing in the history of the anomalous conditions which the fluid presents under such circumstances, nothing in the changed states of its fibrine, its colouring matter, its cells, its salts, its albumen, &c., which in any way warrants us in seeking in such conditions the distinctive and peculiar nature of the disease, or justify us in associating particular diseases with particular con-

ditions of the blood. We deny it not; the time may come when these alterations of the blood's composition shall lead us to definite results; but most assuredly they are far from having done so at present. Our knowledge of these alterations is as yet most indistinct and imperfect, and what can be said concerning them is vague and indefinite.

Take what is called the tuberculous crasis, and let us see how far facts give us legitimate grounds for the assumption of such a particular condition as the expression of tubercular disease manifested in the blood. We will take the description given of it in the excellent manual on Pathology of Drs. H. Jones and Sieveking:—"With respect to the real nature of the tuberculous crasis," says Dr. H. Jones, "we have scarce any exact knowledge. It is evidently a special dyscrasia, intimately connected, as we know, with causes of debility, and leading to the effusion of a matter which shows only the feeblest traces of organization." Now, we must object here at once, and the objection applies more or less to the description of all the other so-called crases of the blood, that what is not proved is here taken for granted; and that there is manifestly a confusion in that part of the history which tells of the crasis and which tells of the exudation. You assume that there is a "special dyscrasia which leads to the effusion of a matter," &c.; but have we not, from observation of the facts of the case, equally as good a right to say, that the effusion of the matter leads to the dyscrasia? What proof have you that some dyscrasial state of the blood precedes the exudation of the tubercle; that is to say, such a dyscrasial state which shall admit of chemical or anatomical definition? Describe the special state, if you are able, in proper terms; or if not, then we think we may very fairly ask you to exclude from your pathology the assumption of such a condition until the time arrives that experiment or observation has given us the right grounds for doing so, by enabling you to define it in set terms. Let there be dyscrasial states of the blood; we can well believe that there are; but so long as such states are founded almost exclusively on hypothesis—legitimate hypothesis, if you please—let us not commit the fallacy of assuming and using such hypothesis in our practical dealing with disease, as though it were a demonstrated fact.

What, we should desire to ask, do you who believe in a tuberculous crasis of the blood pretend to know concerning the condition of the blood, which you say gives rise to the exudation—what do you know of it independently of the actual existence of tubercle somewhere in the body? Do you, can you, ever speak of such a crasis in a body where no tubercle is present in some of its parts or organs? An esteemed writer on consumption speaks of the disease as existing prior to the deposition of tubercle in the lungs; he therefore, we suppose, assumes in practice the truth of the hypothetical crasis; but we would ask, appealing to his own and the experience of every auscultator, how does he prove the truth of the negative he assumes—viz., the non-existence of the tubercular matter in the lungs? Certainly he can only do so by the aid of physical diagnosis, and most certainly physical diagnosis cannot give him that aid; for it is a fact placed beyond any kind of doubt, that a certain amount of tubercular matter *may* exist in the lungs, and at the

same time not betray its existence by any alterations in the natural sounds appreciable by percussion or auscultation.

The fact seems really to be, that we know nothing of the nature of these so-called crases of the blood; all we can say is that, in conjunction with certain diseased conditions of the body, the normal constitution of the blood undergoes changes. How can we speak of a typhus crasis, or an exanthematous crasis, or a croupous crasis, apart from those series of phenomena which demonstrate the existence of those diseases to us in each instance? The crasis, the peculiar condition of the blood, is, we have every right to assume, a partial phenomenon of the disease, associated with some particular *period* of its development. We know far too little of the act which presides over the exudation of the tubercle, for instance, to fix the true and actual period of the development of the peculiar blood-condition which accompanies tubercular disease. As the facts stand at present, we may very fairly maintain that in most cases it is just as probable that the exudation precedes and provokes the crasis, as that the crasis gives occasion to the exudation.

One most important element, as an agent possibly influencing the production of disease, is herein altogether overlooked, and that is the nervous force. That the nervous system must play a part in the guidance and generation of disease is certain; wherever there exists in an organ or part, the display of a physiological function, an office to discharge, or a duty to preside over, we may be certain that the presiding agent which displays the healthy function is capable of being subjected to diseased activity. Applying this self-evident truth to the nervous system, and reflecting for a moment on the all-pervading nature of its influence, the necessity for its continual and instant exercise, as regards nutrition at least, and the mystery which shrouds the manner of its communication with the objects it influences—does it not follow, as a self-evident proposition, that until this hidden region of physiology has been visited, and some of its secret tales told by their discoverer, we have one, and perhaps the greatest, part of the problem of disease unravelled? Nervous influence guides the parts to their healthy nutrition; how shall it not, when perverted, guide them to an unhealthy display of the nutritive function?

This doctrine of crases involves us in an exclusive humorism; but the days of the battles between the Solidists and Humorists should be forgotten in Medicine, just as Neptunism and Plutonism have vanished in Geology—they who supported the igneous, and they who fought in defence of the aqueous, origin of rocks, were both right in part, and wrong only in the exclusiveness with which they defended their particular doctrines. Equally may we believe that they who place the original seat of disease either in the fluids alone, or in the solids alone, split upon the rock of exclusiveness.

What more simple and rational than the conclusion, that *any* item which forms the body may be originally affected by the disease, and secondarily communicate its disordered state to other items? In this wonderful frame of ours, just as in the mighty macrocosm of the universe, we may be sure that not the smallest deviation from the right direction

of the natural forces of any one portion of it remains unresented by the whole; unity of contrivance is everywhere manifest—manifest in the individual parts, and manifest in the perfected being, which is the resultant of the individual parts combined; and as in its healthy, so in its diseased conditions, that which touches a part touches the whole, and with greater or less force and effect according to the energy of the agent and the sensitiveness of the part acted on. In health and in disease the solids everywhere and always affect the fluids, and the fluids the solids.

And this is why we object to the doctrine of primary crases of the blood, and because it is wanting in proof, and because the relation of the crases to particular exudations is insufficiently shown. And in this sense it is that we think Rokitansky has done wisely in reducing his account of the anomalous conditions of the blood to a bare exposition of facts, and to a simple description of the particular diseases with which the anomalous conditions are found to be more or less frequently associated.

It is not alone in this particular instance that we approve of Rokitansky's present volume. When we compare its contents generally with those of its predecessor, we may fairly say that the subject matter, sufficiently abstruse in itself, is now made, comparatively speaking, charmingly simple. The wonderful mass of erudition and research somewhat obscurely related, and partially clouded by hypothetical reasonings and a difficult diction, contained in the former edition, is now worked into clear form, definitely arranged, stripped of mysticism, and brought down to the comprehension of the student, and made available for the practitioner of medicine. We say available for the practitioner, for it is only justice to our author to say, that his relation and mode of treatment of the pathology of disease have throughout a distinct practical bearing upon the practice of medicine; herein fulfilling, as we consider, the most important part of the pathologist's task—viz., the so disposing of his materials as to render them readily convertible to their final and proper object—the cure of disease. The work gives all that can be told of positive and available information on the subject it treats of; and the author is he who, from his immense experience, is more capable than any other of instructing the world in these details.

Of Rokitansky's volume we may say generally, that it has been almost entirely re-written. Necessarily the greater number of specific facts relating to the history of diseases are still found unchanged in their particular descriptions; but the arrangement of them, and their theoretical import and their relative connexions, have all been reconsidered, and adapted to the advance of the pathological knowledge of the present moment. This will be particularly seen in the most important part of the work—that which treats of organized new-growths. The history of tumours has undergone complete revision, and has been made much more clear and satisfactory. We may see this at once by comparing his former and present arrangements of cancer growths. Formerly sarcoma and carcinoma were placed together; they are now separated. We subjoin the present and former divisions of cancer.

Present Division.	*Former Division.*
1. Fibrous carcinoma.	Colloid gelatinous cancer.
2. Medullary carcinoma.	Fibro-carcinoma.
a. Villous cancer.	Medullary carcinoma.
b. Cancer melanodes.	Cancer melanodes.
3. Epithelial cancer.	Typhous substance.
4. Gelatinous cancer.	Villous cancer.
5. Carcinoma fasciculatum.	Epithelial growths, cancer. Carcinoma fasciculatum.
Cystic carcinoma.	Cysto-carcinoma.

The same observations will apply, more or less, to nearly every matter treated of in this volume. The chapter on Anomalies in respect of Number of Parts, has been enriched by many woodcuts, representing the chief varieties of fatal abnormities, rendering this part of the work highly interesting. The addition of woodcuts to the volume generally is not one of its least improvements; indeed, it is impossible, by mere verbal description, to give the reader correct ideas of the minute microscopical characters of diseased parts and products. This is so universally felt, that a work on pathology not so illustrated would hardly meet with much attention at the present moment. Truly we may say, when we view the number of excellent works thus illustrated, now lying before us, that the student and practitioner need plead no excuse for being ignorant of even the microscopic characters of diseased structures.

In speaking of the illustrations of the histological facts of pathology, we may here make mention of 'Wedl's Rudiments of Pathology,' a translation of which, by Mr. Busk, has just been published by the Sydenham Society; it contains a series of most faithful representations, in woodcuts, of the elementary characters of diseased structures. It would not be fair to the author, however, if we did not refer those who are acquainted with the German language to the original work, for therein he will find the illustrations most beautifully executed, executed indeed in a style which we rarely find equalled in this country. Of Mr. Busk's translation of this valuable volume we have nothing to say but what is good. It is one of the most useful works which have of late appeared under the auspices of the above Society; and as a guide to a knowledge of the histology of disease, there is certainly none with which we are acquainted wherein the student will find a greater abundance of valuable information.

We cannot, however, help taking exception to the obscurity of language in which Wedl so often shrouds his ideas; and we fear that in this respect the student will often find his patience tried, when attempting to master this author's meaning. We regret this the more because we consider that the opinions given are generally sound and good *au fond.* The descriptions also are frequently too detailed and diffusely set down; they are doubtless true and accurate, but they require unravelling; and in these days we really expect everything to come to hand with clearness and readiness; that the fact should be shortly stated and distinctly defined. In the following extract, for example, there may be good philosophy, but we cannot tolerate such a manner of telling it:

"It must be allowed that our ideas of tubercle and of cancer are not widely remote, but merely expressions (categories) indispensable in anatomical language,

and requisite for the designation of particular modes of development of certain new-growths. The institution of categories of this kind proceeds from the methods pursued in human thought; at the same time it should not be forgotten that these indispensable categories have such numerous vacancies and deficiencies, that they can only be regarded as ideal, and not as things having an actual existence. Nature shows that in one and the same individual a fibroid tumour may be formed in the uterus, and a medullary cancer in the liver; where, then, is our supposed cancerous *dyscrasia?* It is well known that decided tuberculosis of the lungs, with cavities, &c., occurs, together with cancer in other organs, with intermediate forms. Where, then, is the boundary between cancer and tubercle?" (Transl. p. 579.)

Here, again, we have an opinion of our author, good and sensible as we believe, but nevertheless in language most unfortunately developed:

"In this case it will be necessary further to inquire what criterion we may possess to enable us to judge that a new-growth is of a cancerous nature? These criteria are to be sought, not in the morphological condition of the separate parts of it, but in the entire course of the evolution and involution of the organized new-structure. The study of its evolution teaches us that the *cancer-blastema* (not meaning to imply, under this name, any specificality in it) may remain in its organization as a nuclear, or imperfect cell-formation, of bloodvessels, bone, and cartilage. But however great may be the organizability of the cancer-blastema, it is frequently impeded in its development, inasmuch as the material afforded to the elementary organs of the growth is unfit for their nutrition within the normal limits, owing to the predominance of one substance or another, *fibrine, albumen,* colloid, fat, colouring matter, water, or mineral constituents. The new-formed elementary organ, therefore, falls into a state of involution, and undergoes the corresponding metamorphoses; whilst, in other places, in consequence of hypertrophy, it becomes asymmetrical and deformed. We consider, therefore, that the principal criteria by which we can judge of the cancerous nature of a new-formation must be sought in the multifariousness of its organic development, in the size, shape, and involution of the cells, and of the substance formed by them; the remaining stationary at an embryonic stage; and in the peculiar remarkable inequality in the stages of organization in the various tissues." (Trans. p. 537.)

We again repeat, that Wedl's work is a very valuable addition to our literature; and it is only in respect of occasional embroglios of language, such as here exemplified, that we take exception to it. And while on this subject of language we might remark, that any one who would present the profession with a trustworthy dictionary of modern medical terms would deserve well of his brethren; such an explanatory reference is indeed very much wanted. It is certain that the most literary character who flourished in our profession fifteen years ago, were he suddenly translated from his grave into a modern medical society, would find half what he heard the language of Houyhnhnms to his ears; and we cannot but think that a vast many of these newly-imported terms—naturally enough imported through our free intercourse with German literature—which we daily have in use, do not invariably convey the same ideas to all of us. We may perhaps even go so far as to say, that there are not a few members of the profession who find these expressions altogether beyond them. For all of us, therefore, a clear defining of them would be very acceptable; pre-supposing always that these things are necessary and great additions to the natural poverty of our mother tongue.

A new study, such as microscopy, naturally required a new terminology for the expression of its facts; we have adopted particular modes of

expressing those facts, and therefore we consider the time has arrived that a distinct and clear explanation of the exact value and meaning of the terms adopted should be decided upon. We hope some one may avail himself of the hint here thrown out. It is quite certain that there is at present no reference to which the English reader can turn for assistance when he stumbles against these surprising expressions. Zylography, involution, evolution, retrograde development, abnormity, pionæmia, hyperinosis, obsolescence, osteoporosis, decadence, and such-like terms, naturally puzzle the reader when he first meets with them; and after all he only gets at their meaning in a roundabout way, and through much tribulation. And the same may be said of even plain and simple (in a comparative sense) terms, as exsudate, homœoplasiæ, crasis, dyscrasis, blastema, exulceration, an extravasate, dendritic, collateral filial vesicles, an heteroplase, denticulation, qualitative alienation, and like affiliated words, which are to be met with in every page of the pathological works now rendered classical amongst us under the auspices of the Sydenham Society, and otherwise.

Dr. Foerster's name has already been made known to the readers of this review. He is a careful and good observer; and his judgment sound and practical. His present work 'On General Pathology,' which we are now considering, is evidently modelled on the same plan as that of Rokitansky's. The objections which we should make to it are similar to those which seem applicable to Rokitansky's former editions of his 'General Pathology.' It is more diffuse than necessary, and the most important particulars, consequently, less readily tangible than they should be, and, in fact, obscured by unnecessary details. It is also especially defective in the absence of accompanying illustrations; the references which he gives throughout his volume to his 'Atlas'—another separate work—'of Microscopical Pathological Anatomy,' is very inconvenient; and, as we have before remarked, no student can be expected to fathom the depths of the history of fibres and cells, and come to an understanding of them, by mere verbal description.

The opinions and views of Foerster seem, generally, to be those of Rokitansky; but for clearness, conciseness, and the general purposes of the student, we can in no way compare this volume of his to Rokitansky's present edition of General Pathology.

The following general description of carcinoma, given by Foerster, is a fair specimen of his mode of dealing with the subject:

"Carcinoma is characterized generally, as a new formation, by an unlimited production of cells, which do not belong to any other pathological, or any perfect or embryonic normal, structure, and which never form permanent structures; these cells are generally held together by an alveolar stroma, consisting of areolar tissue and Bloodvessels. Every new formation consisting of such a stroma, and of cells which have not the nature of cartilage-, bone-, epithelial-, glandular-, muscle-, and nerve-, cells, nor of the cells which appear in sarcoma, granulations, and pus,—belongs to the class of carcinomata; if some of the above cells do occasionally resemble the cell of carcinoma, still they differ in this, that they have a typical arrangement and a limited growth."

The unlimited growth of the cell, and its not belonging to any typical form, mark the cancerous nature of the growth much more than any

particular characters of the cells or its nucleus. Generally speaking, the stroma and its alveolar form are characteristic of cancer; but occasionally these may be entirely wanting.

"Excepting the above, cancer possesses no essential or characteristic marks by which it can be distinguished with absolute certainty from other new formations. As a rule, however, cancer is remarkable for its mode of propagation, both locally and generally: it spreads locally, by absorbing into itself the surrounding parts; generally, it presents itself primarily in several organs at once, and it spreads into the lymphatic glands into which the vessels from the affected part run. Another peculiarity is the tendency of the tumour to penetrate to the surface, and then to soften and degenerate. These latter peculiarities are not constant, and to be observed in other new formations, though much less frequently."

All authors are indeed now agreed that there is no *one* characteristic sign, either in its anatomical construction or mode of progress, by which cancer can be distinguished. No one can say with certainty that such a cell is a cancer cell, or that such and such a mode of growth is absolutely the mode of growth of cancer only; for to the cell itself, and to every one of the particulars of cancer growth, exceptions might be taken in this respect.

"A specific character," says Wedl, "has often been ascribed to the cells existing in cancer. Their excessive size, their breadth, the voluminous *nucleus*, the large prominent *nucleolus*, &c., are stated to afford positive characters; so much so, in fact, that Lebert says that even an inexperienced observer will be enabled to recognise them. But we are entirely in accord with Virchow, who denies the specificality of cancer cells. For comparative study, we would recommend the transitional epithelium on the ocular conjunctiva, the epithelial cells of the tubuli uriniferi in Bright's disease, many kinds of ganglion cells, the newly-formed cells in the gelatiniform uterine mucus, in many gelatinous exudations, chronic ulcers, soft uterine polypus, in the epidermis of condylomata, warts, &c. Unprejudiced observation will then satisfy any one, that he would but too often be the victim of delusion in laying too great a stress upon the value of the supposed characteristics of the so-termed cancer cells." (Transl. p. 526.)

It may be true that, at the present moment, the line which distinguishes malignant from other growths is not clearly defined; but still it is very certain that, in practice, the difficulty is one which rarely troubles us, and the question may be looked upon rather as one suggested by microscopic subtilty than as arising from any necessity for its absolute solution felt by the practitioner. Our ideas as to the benign or malignant nature of a growth are founded on its mode of progress, not on its anatomical construction alone. Thus, whatever its microscopical characters, every tumour must be set down as malignant which possesses the following characteristics:—constant progress; returning after extirpation, not only in its original seat, but also in distant parts of the body; destroying and absorbing the parts or organs it invades; infiltrating the tissues around; and affecting the glands to which the lymphatic vessels lead from the seat of disease.

The fact is, that in the majority of cases malignant growths offer a peculiar anatomical construction, but that they do not do so invariably; and, on the other hand, growths which have in a marked degree that peculiar construction, do yet not present the characters of malignancy in every instance. From this it follows, to use the language of Dr. H. Jones,

that "the characteristics of cancer result from the invisible qualities of the new formation, its mode of vegetation, dissemination, and reproduction, not from any peculiarity of form or arrangement of its particles."

To return to Rokitansky. We have said that his first volume has undergone a general revision; and as a proof of this, we will here introduce a condensed account of the history which he gives of tubercle, requesting our readers to compare it with that to be found in the previous edition of his General Pathology. We shall also touch upon some other interesting facts of general pathology here treated of, and shall trust, by so doing, to call the attention of our readers to the excellence of this new volume of Rokitansky's work on Pathology; his improved manner of dealing with his subject; and the many modifications which his opinions have undergone.

The chapter on Tubercle is entirely remodelled, and many of the ideas concerning it which he formerly asserted have undergone revision. Words like fibro-croupous tubercle, tubercle-pus, fibrinous tubercle, tuberculizing new-growths, dyscrasial character of the blood—these all, and the ideas associated with them, have happily entirely disappeared; and in their place we have a plain unvarnished history of tubercle, clear, and adapted to ordinary comprehensions. Tubercle here is simply tubercle, and not half-a-dozen other things besides. It takes its name from its external form, and is found as small nodules, isolated or grouped together, and as large irregular masses widely spread over and through the textures of an organ. Its essential character is that it is incapable of further development, that it tends to degenerate, and thereby to the destruction of the tissues around it. However alike to tubercle in its external form and original constitution any abnormal product may be, if it exhibits a trace of fibrous development it is not tubercle.

Tubercle appears under the form of grey or yellow tubercle-masses. The nature of these, as we all know, has been much discussed. In form, the two kinds of tubercle resemble each other: roundish, granulations, of about the size of millet seeds, isolated or grouped together in irregular nodular masses. *Grey tubercle* is of uniform consistence, toughish or softish, compressible, and of pearly-grey colour. It is composed essentially of nuclei, $\frac{1}{125}$ to $\frac{1}{100}$ of mill. diam., held together in an adhesive binding medium; besides these there are present, cells containing one or more nuclei, which indicate an endogenous development and growth of the before-mentioned elements. *Yellow tubercle* is of various shades of colour, opaque, friable, and of cheesy lardaceous consistence. It contains a large abundance of fine protein molecules; among which are present the elements of grey tubercle, shrivelled, indented, and wrinkled, and of a yellowish lustre.

In what relation do these kinds of tubercle stand to each? Is yellow tubercle originally distinct from, or a metamorphosed condition of, grey tubercle? To this Rokitansky answers: Grey tubercle is without doubt converted into yellow tubercle, as Laennec taught; certain other abnormal products, not tubercular, may, it is true, undergo the same metamorphosis, but still the metamorphosis is most peculiarly related to that formation which originally appears as grey tubercle. In so far as this metamorphosis occurs at an early period of the disease, and advances rapidly, it might seem as though the tubercle was, in its origin, yellow and opaque.

Tubercle is developed in the following manner:—A clear, or turbid, greyish-red, adhesive, synovial-like exudation is poured out into the parenchyma, for example, of the lungs. This is the *albuminous tubercular infiltration* of Laennec. In this exudation spring up at separate points grey granulations, congregated together in little groups; these, at first soft and moist, gradually become condensed and resistent, or the texture in the part corresponding to the infiltration becomes uniformly swollen, and gradually assumes a fine granular structure, representing *tubercular infiltration of the lungs.* Minute investigation shows us, that in this infiltration the elements of tubercle are developed. On serous membranes we find the tubercle deposited as fine, vesicle-like, softish, greyish or opaque, discrete granulations, forming, when very numerous, a continuous nodular-like layer of granulations. These are to be distinguished from tubercle developed in pseudo-membranes. Whether the tubercular elements arise in the exudation as a free blastema, or whether they are developed in the parenchymatous blastema, is uncertain.

Grey tubercle sooner or later is metamorphosed into yellow tubercle; in some rare cases the granulations become obsolete—that is, are converted into hard, horny nodules. The metamorphosis generally commences at the centre of the tubercle, perhaps because there the growth is of most ancient date. The yellow tubercle undergoes further changes. Its solid parts become softened down into a tolerably uniform, creamy, purulent-like fluid, in which are found an immense number of fine granular points, and some scattered elements of yellow tubercle. This is to be distinguished from the thin, whey-like, flocculent fluid, known as tubercular pus. This softening is a further spontaneous degeneration of yellow tubercle, and is different from the mere disintegration of the tubercle mass under the influence of the surrounding effusion; for it commences in the centre even of large masses. Tubercle has no vessels proper to it; but the remains of vessels and other elements of the texture invaded by the tubercle may be found in the softened mass.

Inflammation plays an important part here, in so far as it occasions an exudation into the parts around the tubercle mass, which exudation serves as a basis for the further regeneration of tubercle. Likewise inflammation supplies the materials which form the fibrous thickenings and capsules around the tubercular cavity or ulceration. The separation of the tubercle-mass from the textures around it, is also often occasioned by inflammation; the elimination of the separated mass produces a cavity or ulceration: tubercular phthisis.

The softened tubercle sometimes undergoes *Cretification*—that is, it is converted into a greasy, fatty, chalky mass, which is gradually hardened into a cretaceous substance.

In its mode of development, tubercle offers important differences. 1. It often arises in a slow and insidious manner, in the form of distinct granulations confined to one portion of an organ; these gradually increase in size and number, destroying the textures they invade; or they suddenly and rapidly increase, as in the following mode of growth. 2. In this case, the tubercular granulations are rapidly and extensively deposited, and are not confined to one organ. The tubercles thus deposited are of uniform size (miliary tubercles), and regularly distributed through the

tissues. They are found, in different stages of development, at different parts of the same organ: those of recent growth soft and gelatinous, those of older date firm. The tissues thus invaded are softened and infiltrated with a thick serous effusion. Tubercular disease of this kind appears as an acute disease, with typhoid phenomena: *acute tuberculosis*. It is rarely a primitive form of tubercle. 3. The third form is *infiltration of the tissues;* it appears, as seen in infiltration of the lungs, under the form of a thick, synovial-like fluid (*albuminous infiltration*), which gradually degenerates into a firm, greyish-red, granular, broken-down mass, containing portions of tissue within it. The nature of this effusion, the rapid development of the tubercle in it, its lobular form, and the growth of areolar tissue in it, are facts which favour the opinion of the inflammatory origin of this form of tubercle. This tubercle is generally metamorphosed into yellow tubercle; it runs a rapid and acute course, softening and destroying the textures which it surrounds.

The peculiarities of tubercle indicate that it is an especial anomaly of nutrition, which is frequently associated with a particular organization of the individual. It excludes the co-existence of other diseases. Cancer very rarely co-exists with it, and the especial parts attacked are different in the two diseases. Typhus, heart diseases, certain lung diseases also—emphysema, for instance—rarely co-exist with it.

Tubercle attacks nearly every part and organ of the body, and even new growths, but with marked difference in degrees of frequency: the lungs most often, then the intestinal canal, lymphatic glands, larynx, serous membranes, brain, spleen, kidneys, liver, bones and periosteum, uterus, testicles, and spinal cord. Tubercle very rarely, if ever, affects the salivary glands, the ovaries, the bloodvessels, the œsophagus, and the vagina. Moreover, tubercular disease of the intestines, of the larynx and trachea, of serous membranes, of the spleen and liver, is seldom other than secondary, and therefore of minor import.

In every organ, there is one particular part especially prone to the attacks of the tubercle: for example, the apex of the lungs, the pia mater about the pons Varolii, the grey substance of the brain, the spongy part of the bones, the lower part of the ileum, &c. The tubercular disease rarely spreads from the larynx into the pharynx. It attacks the old and young, but especially adolescents. It is generally fatal, and destroys life by injuring the functions of organs, through ulceration, marasmus, and destruction of tissues; and when acute, with symptoms of blood disease. Tubercle may undergo cure by obsolescence, cretification, and elimination; but such cure avails not the patient, if new tubercle is continually deposited. Cure is effected by means of a firm capsular scar.

Such is the account, in a condensed form, given of tubercle by Rokitansky. It is plain and simple. Many of the opinions the author formerly held concerning tubercle will be found altered or modified. Any one who will compare this with the account given in the former edition will see how completely the subject has undergone revision.

The entire subject of organized new growths has been new-cast, and modified in many important particulars, by Rokitansky. We shall therefore take a rapid view of the author's present views concerning these new growths and tumours, and point out the modified arrangements which

they have undergone in his hands. The interest which attaches to the subject is great, and well warrants us in throwing all the valuable light that is available into the obscurity which, in many particulars, still surrounds it.

Fibrous tumour is that which Rokitansky formerly called *gluten-yielding fibroid tumour.* It is distinguished from other areolar-tissue formations by its well-defined isolation in the tissues where it is seated, and from which it may be peeled out. Its chief seat is the uterus and its appendages.

Sarcomata differ from fibrous tumours through not being well-defined and circumscribed. Though frequently surrounded by a species of areolar capsule, they are nevertheless generally intertwined into the textures of the organ, so as not to be removed without injuring these. They are found in the areolar tissue; in fibrous membranes, as on the dura mater, peritoneum, periosteum; between muscles and their tendons; in bones, particularly the facial bones; in the mammary and parotid glands; in the testicle, ovary, and the brain. They frequently appear at an early period of life, and are generally solitary, and, as a rule, completely curable by extirpation. They often decay, through the inflammation and sloughing of the membrane around them, whereby they are left denuded. They never ossify. They are usually formed both of embryonic-gelatinous and of fibroid-areolar tissue; but sometimes one and sometimes the other of these elements prevails, and then the tumours are distinguished as *gelatinous sarcomata* or *fibroid sarcomata.*

Gelatinous sarcoma is represented—1. By the collonema of Müller: a soft, gelatinous, tremulous, semi-transparent, greyish-yellow, non-vascular mass, containing fibres; and 2. By growths more firm and resistent; the gelatinous part being more consolidated, undergoing either conversion into enchondroma or into fibrous texture, whereby the gelatinous sarcoma is converted into fibrous tumours. Bloodvessels often abound in this sarcoma. Fibrous sarcoma is distinguished from fibrous tumours, and especially from those of the uterus, by its succulence, and the diminished density of its stroma. Its seat is especially fixed in sub-mucous, fibrous, and muscular textures, forming so-called fibrous sarcomatous polypi, which in form take the shape of the cavity into which they intrude. These are very vascular. Under the sarcomata may also be included the *neuromata,* the *irritable tumour* of Sir A. Cooper, and *epulis.*

Papilloma is a papillary form of growth, of gelatinous areolar substance; it is seen particularly on the skin and some of the mucous membranes; and also in textures where there exists no natural papillary formation. It is simple or compound, having a cauliflower form. Its nature is either benign or cancerous.

New formations of elastic tissue are found, either alone or mingled with the former-mentioned growths. Pleuritic false membranes not unfrequently represent the pure elastic tissue.

Cartilage and bone-formations follow next, and the account given of them is much the same as that given formerly.

Fat-formations.—Small lipomata not unfrequently disappear, and leave no trace behind them. In larger ones, there sometimes occurs an absorption of the fat-cells, the areolar tissue being left; and in old fat-

tumours, chalky mortar-like masses are often found in the place of the fat-cells. Fat-formations are no longer arranged under the titles of normal and abnormal fat-textures, and free-fats; but they are now described as obesity, lipoma, and free-fats. Cholesteatoma is removed from this division, and is now placed under the head of *epidermic formations*.

New formation of muscular tissue.—Cell-fibres, which resemble more or less organic muscular fibres, may be observed as constituents of different abnormal growths; but true organic muscular fibre of new formation can exist only in the form of muscular hypertrophy. New growths of striped muscular fibres have been often described by observers; but the fact is still matter of doubt.

New formation of nerves.—Virchow has seen nerves in false membranes of the pleura and peritoneum; and Rokitansky has observed an independent nervous apparatus springing from a ganglion in an ovarian cyst. Both he and Virchow have frequently noticed a new growth of grey cerebral matter extending into the ventricles in the form of small tumours.

New formation of bloodvessels.—This chapter is entirely re-written, and much enlarged. Our author's views have undergone considerable change concerning the mode of formation of the vessels; obscurity, however, still hangs over the subject, although much information has been added to our knowledge since the former edition of this work was published. Several interesting memoirs, named at the head of the chapter, have lately appeared, and by these Rokitansky illustrates anew the subject:

"It is matter of certainty," he formerly wrote, "that such new vessels by no means originate through any prolongation of pre-existing vessels in the contiguous textures, but that the new process of development is altogether an independent one, and that only at a later epoch do the new-formed vessels enter into anastomosis with the older ones."

He now says that it is most probable the bloodvessels of new growths arise through the prolongation into them of the original vessels of the membranes, &c., from whence the new growths are derived. Thus, in the false membranes of serous sacs, the bloodvessels extend from the original vessels of the sac, and increase and grow towards each other either as solid fibres or as tubes with club-shaped extremities, which eventually open into each other, and probably by dehiscence; and thus vessels developed in the visceral and parietal layers of the new growth of serous sacs, when the surfaces of the sac become united, anastomose with each other. In this manner also, in all probability, arise the vessels of other new growths, such as fibrous tumours; and in part, also, those of carcinoma. Vessels also may be formed by the union of cells in the new growth, whereby a tube is formed; but the mode of union has yet to be explained. These vessels differ much in their structure, size, and mode of distribution.

The development of *blood* in new growths seems more improbable to us now, inasmuch as we consider the chief source of the new growth of bloodvessels to be derived from pre-existing vessels; but nevertheless, the elementary development of blood-corpuscles in certain structureless hollow growths, must be admitted. Numerous observations have shown that there are certain cell-like forms which contain unmistakeable blood-corpuscles: thus, a group of such corpuscles has been observed, sur-

rounded by a structureless membrane; a development of them has likewise been seen within certain nucleated cells.

The pros and cons of this subject are stated at length by Rokitansky and illustrated by original observations; to these we must draw the attention of the reader, warning him not to quote the English form of Rokitansky's volume as that which contains his present opinions. Under this same chapter are included *vascular tumours, telangiektasis, cavernous blood-tumours*, concerning which new and original details are given, which will prove of especial interest to the surgeon. Our author also refers to a *development of vascular canals* which takes place through absorption of the new formation deposited on the inner surface of an artery, whereby a system of canals is formed, which open by fine mouths into the artery, and are filled therefrom.

Passing over the chapter on pigment-formations, which is re-written, and the chapter on new growths of the external skin, mucous and serous membranes, and of epidermic and hair-formations, and on glandular growths, we come to *cyst-formations*, a subject full of practical interest. Rokitansky here also tells his tale anew; he has condensed his matter, re-arranged it, and brought it into relation with our present knowledge of the subject. What is a cyst? It consists essentially of a closed membranous sac, generally lined with epithelium, and containing semi-fluid matters. Capsules surrounding tubercle, exudations, &c., are excluded from this category. The contents of the sac vary much. 1. We have cysts with serous, synovial-like contents; hydatids, ganglionic cysts, hygroma; such are the commonest kind. 2. Then colloid cysts, melliceris. 3. Fat-cysts next, cysts containing fat in the form of margarine, elaine, buterine, &c. 4. Cysts filled with nuclei and nucleated cells, epithelial cells; with a dendritic vegetation, with areolar tissue, or with an abnormal or normal parenchymatous tissue. Milky fluids and milk are also found in cysts situated in the mammary gland; spermatozoa in cysts about the spermatic cord, &c. The original contents, whatever their nature, moreover, frequently undergo considerable changes in the cyst.

Cysts, again, are simple-one-cysted, or compound-many-cysted: of the many-cysted sort there are several varieties. Next follows a description of the mode of growth and anatomical constitution of the dendritic vegetations, the excrescences, flattened, branched, pedunculated, cauliflower-like, villous, which frequently grow on the inner surface of cysts.

We now come to a most important consideration—viz., the origin of these cysts. 1. They may result from a process going on around serous exudations, &c., in consequence of which the pre-existing or a new-formed areolar tissue is converted into cyst-walls surrounding the exudations. Of this sort are the cysts formed at the parts of limbs exposed to pressure subsequent to amputation, synovial cysts, &c. 2. They may be produced from pre-existing physiological structures, as from incomplete closure of the processus vaginalis upon the spermatic cord: as diverticula also of serous and mucous membranes. They also arise through dilation and hypertrophy of the tissue around a follicle resulting from accumulation of secretions within it, in consequence of obliteration of its excretory opening; inflammation sometimes being the exciting cause. Of this kind we have examples in the follicles of the ovary, the vesicles of the thyroid gland, the Malpighian capsules of the kidney, the mucous glands, as at the

back of the larynx, &c.. The contents of such cysts frequently afford no trace of their original constitution; the bile or urine, &c., are absorbed, and are replaced by mucus or serum, or metamorphosed into colloid or cholesterine matters.

3. Cysts, again, arise as new formations. They grow as vesicles, with a fibrous alveolar structure. They may be simple or compound; and in relation to their vesicular origin, often attain a considerable size, seldom, however, exceeding that of a walnut: generally speaking, they are about the size of a hemp-seed. They occur frequently, congregated together as microscopic forms or otherwise, in the cortical parts of the kidneys, in the broad ligaments of the uterus, in mucous and serous membranes, in the brain, in the mammary gland, in sarcoma, carcinoma, and dendritic vegetations. They contain a serous, synovial fluid, which often degenerates into colloid and resinous-like masses; in the fluid are found granules, nuclei and nucleated cells, simple structureless vesicles, colloid particles, fat-cells, cholesterine, &c.

These cysts also arise out of a new-formed fenestrated growth; the walls of the loculi of the compound fenestrated growth uniting together, and forming enclosed spaces. True cystoid tumours represent such formations. Like fenestrated growths in general, they vary in size, reaching even that of a walnut; originally, however, they are, as a rule, microscopic objects. Thus they are situated at one time in a fine microscopic areolar tissue; and at another in a fully-developed fenestrated growth; very commonly they are placed in the middle of a large fenestrated growth, which spreads out with an uneven nodular surface in all directions.

In the fenestrated growth a loculus may be developed, so as to form a parent cyst; or again, a loculus in the inner layers of the fenestrated growth may so expand as to intrude into the space occupied by the parent cyst, forming thus a secondary cyst, which process again may be repeated by a tertiary cyst. More frequently, however, the pre-existing fenestrated growth around grows in mass into the cyst, forming a tumour having a neck or a broad basis; which tumour, again, may give rise to a development of closed loculi and cysts. Sometimes the number of these is so great, that they completely occupy the cyst, even when of considerable size, pressing against and flattening each other.

There is another kind of cystoid growth found, particularly in the ovary, and there often attaining a very great size; it contains in its loculi and cysts a thin serous fluid, mucus, a gelatinous or a medullary mass—then representing the largely-developed stroma of a gelatinous or a medullary cancer. Some of the loculi are fat-cysts also. Another growth of this kind is developed in the sub-mucous areolar tissue, or in the parenchyma of mucous membranes, in the form of a broad roundish swelling, or pedunculated, distended with a tough mucus, dehiscing at its periphery, and displaying a fenestrated growth, containing numerous various-sized loculi. It is found especially in the uterus and in the stomach. Its contents frequently degenerate into colloid matter.

Then there is a pedunculated, hanging, bag-shaped, simple or pouched cyst. It is found on the walls of cysts, on the mucous membrane of the bladder, and is generally filled out with areolar tissue, of the fine trellis-work form. It seldom exceeds in size a pea or bean.

4. The last division of cystic forms is a combination of cysts with other new formations, as with sarcoma or carcinoma.

As a summary, we find that—The number of cysts in an individual or in an organ varies indefinitely; there may be one cyst in the organ, or the organ may contain an aggregation of cysts. The form of a single cyst is ordinarily roundish; that of aggregated cysts very various. Their structure may be gathered from what has been said above. In the cystic diseases of mucous canals, the mucous membrane and muscular elements disappear as the walls of the cyst expand. There is scarcely an organ or a tissue in which cysts have not been observed. Most commonly, we find them about the peritoneal coverings of the female sexual organs, in the ovaries, then in the kidneys, thyroid and mammary glands, in bones, mucous membranes; less seldom, indeed rarely, in other organs—liver, spleen, lungs, &c. They are rarely congenital. Their nature is benign and malignant. Hæmorrhage frequently occurs in them. Hyperæmia and inflammation also attack them. Sometimes they ossify.

What we have here given of the history of cysts will suffice to show how totally the subject has been revised by Rokitansky, and is a tolerable specimen of what has been done in many other parts of this volume; demonstrating, we think, pretty clearly, that the present English form of his work must no longer be taken as the exponent of our author's opinions.

Let us now take a condensed view of our author's account of carcinomatous tumours.

By malignant, Rokitansky understands those growths which, either of themselves or consequent upon extirpation, multiply and are reproduced in the neighbourhood of their original seat, and also in distant and different organs; giving rise to marasmus through their actual increase and nutrition, not through any hindrance which they occasion to the function of the organ they invade. Their constitution is heterologous; they are infiltrated masses which spread out into and destroy the textures around them; having a marked tendency to suppuration, whereby the growth is not only increased in the textures around, but is generated in distant parts, particularly in the lymphatic glands. It must be remembered, however, that every malignant growth does not present these peculiarities; and that, on the other hand, certain benign growths exhibit many of them.

Cancer is a malignant growth, in the sense here given. It consists of two parts—viz.: 1. The peculiar *cancer mass*, which is formed of nuclei and nucleated cells, of the most varied natures, distributed through an inter-cellular medium; and 2. Of areolar tissue, which constitutes the *stroma*. The first is the most essential, and the heterologous part of the cancer. The relative quantity of these parts present in a cancer gives it its character; when the cancer-mass abounds, the tumour is *medullary*, &c.; and when the stroma abounds, it is *fibrous*.

The *stroma* takes very varied forms; it is arranged as net- or trelliswork, having larger or smaller interspaces; and also as papillary, villous, or more or less ramified, vegetations. The fibrous stroma sometimes undergoes ossification, forming a network of true bony texture. Occasionally the stroma is absent altogether, and then the cancer is formed wholly of nuclei, nucleated cells, and their connecting medium. The stroma must

be carefully distinguished from the areolar tissue proper to the organ in which the cancer is developed; and so also ossified stroma from particles of original bone present in the cancer-growth of bones.

The cells of the *cancer mass* vary much. Some are homœoplastic, as in epithelial cancer. The cells frequently grow to mother cells; the nuclei to structureless, sterile, or prolific vesicles (bruterzeugende Blasen). Although the cells of the cancer mass offer in themselves nothing characteristic, they are often remarkable for their size, and especially for the size of their nucleus and its nucleolus. The cancer mass, however, sometimes consists merely of small, pus-like cells, and often, indeed, of nothing but nuclei. Some cancers are very rich in bloodvessels, some very poor.

As the blastema of cancer, we not unfrequently find in cancerous formations an albuminous, synovial like, colourless or pale-yellowish fluid, contained either in the interspaces of the stroma, or collected in a foyer. It gives rise both to the materials requisite for the development of the elements of the cancer juice, and to the essential cancer-mass, in which the stroma grows. The blastema of cancer is, for the most part, insensibly produced, but its production is occasionally attended by inflammation and stasis. The development of cancer, therefore, generally takes place as an exudation into the interstices of textures, and on to the free surfaces of membranes; it may probably also arise from endogenous growth within certain cells, as bone-cartilage, &c., cells.

Cancer is also developed within the bloodvessels, out of fibrinous coagula. Also we find widely-branching cancer masses in different veins, cauliflower masses in the vena cava, in the right side of the heart, either loosely attached to the internal membrane or firmly connected with it, being perhaps produced out of fibrinous coagula. It is very probable, also, that cancer arises, in an acute form, in parenchymata, through infarction of their capillaries.

Hypertrophy of neighbouring organs generally accompanies the formation of cancer. The size of the cancer varies much, as likewise the number of parts affected. The size and the number of tumours present seem to stand in an inverse ratio to each other; solitary cancers often attain a very large size.

Cancer is rarely cured by extirpation, generally returning either in the part or in other organs of the body. There are certain organs, such as the lungs, spleen, salivary glands, small intestines, and serous membranes, which are rarely ever attacked primitively by cancer. The most ordinary sites of primary cancer are the uterus and female breast, the stomach, the colon; the liver, bones, and brain, &c.

Particular kinds of cancer affect particular organs; alveolar cancer, the stomach and intestines; epithelial cancer, the skin and mucous membrane. Certain organs are usually affected simultaneously; as the uterus and ovaries, the testicles and kidneys, the stomach and intestines; the spleen with the liver.

Extravasations of blood often accompany cancer through rupture of the bloodvessels.

Cancers, when they come in contact with the air, suppurate; and in some rare cases may thus undergo a cure.

Having said thus much of the general characters, we must pass over

any particular notice of the different kinds, of cancer. We have already referred to the different divisions which Rokitánsky now makes of these tumours. Generally speaking, as indeed we might conjecture, the alterations introduced into this part of his pathology are not so extensive as in many other parts; though the subjects have been mostly re-written, and many additions made to them. The chapters on Epithelial and Colloid Cancers have, in particular, been thus improved and extended.

A new chapter on the Diseases of Tissues is added to this volume. It gives an account of the changes which occur in the normal constitution of the elements of textures; the resolution of the elements into molecular detritus; fat metamorphoses; colloid and cellulose metamorphoses; ossification and incrustation; obsolescence. The chapter which follows this, on the Anomalies of the Contents of Parts, has undergone but little change.

The last part, containing the anomalies of the blood, has undergone a thorough reform. The long and complicated history of the various crases of the blood detailed in the former edition now no longer exists here. It will surprise, we fancy, those of our readers who are acquainted with Rokitansky's ideas, as portrayed formerly, to hear that the word crasis or dyscrasis is under this head not to be found. He gives, instead of those many pages of blood-crases, a simple account of the qualitative and quantitative abnormal states of the blood, reducing these under the heads of anomalies in the quantity of blood; anomalies in the quantity of blood-corpuscles; anomalies of the fibrine; diseases of the blood-corpuscles; pyæmia; foreign bodies in the blood. One or two particulars we may refer to. Under anomalies of the blood-corpuscles, we have an account of the anomalies of the colourless corpuscles. The colourless corpuscles are increased—1st. With simultaneous increase of the red corpuscles, as in typhus, the exanthemata, in puerperal states, ague, marasmus, and extensive atheromatous disease of arteries. 2ndly. With increase of fibrine, the coagulum of the blood drawn being opaque, whitish, or yellowish; and 3rdly. The colourless corpuscles are so increased that the red colour of the blood is nearly lost, so that it at last becomes an opaque whitish fluid, representing leucocythemia (Bennett). The coagulum then found in the body after death is whitish-yellow, or greenish, like congealed pus, sticky, and softish, here and there studded with streaks of red corpuscles; it reaches generally a long way into the arteries from the heart. The increase of the colourless corpuscles gives rise to an increase of the fibrine of the blood, to stasis and exudation, and particularly to coagula in the vascular system in the heart under the form of numerous vegetations. Rokitansky considers that the colourless corpuscles may be formed in the blood, within the vessels; and does not allow their only source to be in the spleen and lymphatic glands, and particularly in the plasma of inflammatory depôts.

Inflammation and purulent deposits of the lungs, he observes, the skin, cellular tissue, the spleen itself, &c., are often observed in leucocythemia. Many of these are recent, caused by and consequent upon the leucocythemia. The spleen tumour also often shows marks of inflammatory enlargement.

The leucocythemic blood resembles so completely the pus contained in exudation-fibrine, that the more often we meet with it in connexion with

purulent deposits, the more inclined are we to regard it as a pyæmic condition. Leucocythemia is, in fact, to be distinguished from ordinary pyæmia arising from absorption of decomposed animal matters; it would rather represent the bland condition of laudable pus.

One other very interesting point our author here also touches on somewhat at length—viz., the coagulation of the blood within the vascular system. In every part of the vascular system coagulation may occur. In the heart—the only part we shall here refer to—we find it as a roundish mass, or as a membranous expansion, winding around in all directions among the trabecula of the ventricles; or again, as a villous appendage to the endocardium. The coagulum varies in colour according to the amount of red-corpuscles present; it may be formed in layers, or consist of an uniform mass, and increase often in the direction of the current of blood; forming fibrinous tumours of the heart.

The causes of these coagula are many; they reside partly in the blood, and partly external to it; frequently the causes, both within and without, work together in producing them. 1. *Mechanical causes* act by causing stagnation of the blood, as in the thrombus arising from ligature, and coagula through weakened action of the heart, &c. Under this head also must be included roughnesses and false membranes on the inner surface of the heart and the vessels, rupture of the valves, &c.; it is of great importance, however, not to mistake these growths in the endocardium and the valves, &c., for coagulated fibrin. Then, again, small particles of fibrin, or of the valves themselves, or of other textures, carried into the capillaries from the cavities of the heart, cause capillary infarctus. 2. *Inflammatory exudations* taken up in the blood, as in inflammation of the endocardium, of the arteries and veins, also occasion obstructions primarily and secondarily. 3. Lastly, there are conditions of the blood itself which give it a tendency to coagulate, conditions which probably arise in the colourless elements of the blood.

Before closing this notice of Rokitansky, we must say a few words on the subject of Inflammation, as now described by him. Here our author again has made great changes. His description of the phenomena attending the inflammatory process is reduced from several pages to half a dozen lines. Of *dyscrasial* inflammations he has no word to say.

Inflammation, we find, is an abnormal process of nutrition, in which an exudation takes place consequent to *stasis* of the blood. The following phenomena characterize the particular stages of it. 1. *Hyperæmia;* accumulation of the blood-corpuscles in the capillaries, retardation of, and an oscillatory movement in, the blood-current. 2. *Stasis;* stagnation of the blood, cleaving together of the red corpuscles, and increase of the colourless corpuscles. 3. *Exudation of blood plasma.*—Our author shortly relates the different theories which have been given as explanatory of the phenomena, but seems himself disinclined to become entangled in the wide and labyrinth-like discussions to which their investigation inevitably leads. He wisely confines himself to the detail of what observation teaches.

The *stasis* is the most important part of the inflammatory process. It consists essentially in a cleaving together and accumulating of the red corpuscles in a plasma which has become thickened through a previous

transudation of the blood serum from out of the vessels, and in an aggregation of the white corpuscles, the blood assuming at the same time a dark brownish-red hue. The exudation may be explained (independent of all molecular attraction) by the pressure to which the plasma in the vessels is exposed through the stasis; and it is favoured also by the co-existing distension of the coats of the vessels, and consequent increase of their permeability. *Œdema*, serous effusion, takes place around and to a certain distance from the central point of inflammation; the further the effusion is from the central point, the poorer is it in plastic constituents.

The next stage of the process succeeding the exudation is restoration of the blood-current, whether in consequence of their returning contractility, or through the cessation of the temporarily excited contractility and narrowing of the arteries leading to them, and therefore through the impulse transmitted from them.

Inflammation varies in many particulars. 1. It varies in its degree of intensity; a most important fact, directing us to a right knowledge of the rank of the inflammation in the anomalies of nutrition. By the quantity and quality of the exudation we best measure the intensity. Some kinds of (so-called) inflammations reach not the stage of true stasis; they are rather protracted hyperæmiæ tending to stasis. Such are mostly chronic in their course; their exudations being serous, poor in plastic materials, and irregularly poured out. Other inflammations there are, acute in progress, rich in plastic exudations, and marked by a highly developed degree of *stasis*.

2. Every hyperæmia may end in stasis. Here, we may mention *hypostatic inflammations* occurring in dependent parts of the body in the course of adynamic diseases—the so-called asthenic inflammations. The hyperæmia and stasis are characterized by a dark livid redness, the result in part of imbibition, and in part of vascular injection; the exudation is coloured by blood-colouring, and poor in plastic matters. Mortification is their not unfrequent consequence. Stasis may also be caused by *mechanical hyperæmia*, and then is characterized by great swelling and dark-red colour. It readily ends in mortification, and is generally accompanied with large serous effusions.

3. In its mode of *spreading*, inflammation differs much. It may attack a part or organ at one or many points (foyers), may extend over a large surface, or invade every portion of an organ.

4. The exudation offers important distinctions both in itself and in relation to the tissues it invades.

We rarely have an opportunity of observing the exudation in its pure and original form; for directly it is poured out, a process of development, as well as other changes, commence within it. It is probable that the inflammatory stasis is not a mere simple stoppage of the blood, leading to an increased effusion of the nutritive plasma; but that it gives rise to qualitative changes in the plasma, causing it thus to differ from the plasma of healthy nutrition.

What is meant, then, by exudation? What is that which, in an inflamed part, constitutes the exudation? In answering this we must carefully distinguish *two essentially different ingredients* of the inflamma-

tion, which may be seen well marked in the case of inflamed serous membranes—viz., (1) the pure *Inflammatory exudation;* and (2) the *Tissue-formation*, which, consequent to it, arises in and out of the substratum of the inflammatory process; the pseudo-membrane of serous membranes.

In the inflammatory exudation (which, both in respect to its composition and development, stands in the most intimate relation to the process going on in the capillaries during the stasis), forms corresponding to the colourless elements of the plasma are developed. These elements are—*Elementary granules*, *Nuclei*, and *Nucleated cells;* and besides these, a greater or less amount of *Exudation corpuscles.* These are held either in a fibrinous network (coagulated fibrin), or in a shapeless, striped, hyaline mass resulting therefrom; or they are distributed through a fluid, intercellular matter, and occasion, when in large quantity, the whitish, yellow, or yellowish-green colour, the opacity, and the thickish-creamy, fatty-like consistence of the exudation.

These elements may be present in very small and in very large quantities, and in all intermediate degrees. When very abundant, they give to the exudation the character of pus. They are ever alike, so that what has been said as characteristic of the elementary forms of pus (hitherto unnaturally separated from other exudations), refers equally to all.

The *Cells* are round, colourless, or yellowish, containing generally granular matter; and enclosing two, three, or more nuclei grouped together, $\frac{1}{100}$ to $\frac{1}{66}$ mill. diam. The *Nuclei* are roundish, shining vesicles, $\frac{1}{200}$ to $\frac{1}{166}$ mill. diam., having a dark contour; in their granular contents, one or more nucleoli are seen. Besides these round, there are also oblong, &c. nuclei.

The *Exudation corpuscles* are vesicles (Bläschen) nearly of the same size as the cells. They have no nuclei, but enclose a fine granular matter, in which one or more nucleolar like, shining corpuscles, with a dark contour, may be often remarked. They may be regarded as nuclei of inordinate size and growth; just as cells are seen here and there in exudation matter, which exceed the ordinary measure.

These different elementary forms are incapable of further development. On the contrary, they undergo a retrograde metamorphosis; fatty conversion, absorption, granular degeneration, &c. &c.

Pus, though hitherto improperly separated from other exudations, deserves a special consideration. It is a yellowish-greenish, thick, fatty-like, alkaline fluid; it is distinguished by the abundance of the above-mentioned elements which it contains. The relative amount of these elements differs greatly; normal pus is constituted almost entirely of cells; and then, again, pus may consist almost wholly of pyoid (exudation) corpuscles. Very commonly, also, fatty granules, ammoniacal phosphates, and sometimes infusoria, exist in it; so, also, there may be blood, mucus, epithelium, and the remains of broken-up tissues. These elementary forms float in a *pus-serum*, in which they sink when at rest. Pus undergoes several metamorphoses; fatty and calcareous changes; resolution into fine granular detritus, &c.; and conversion into a mucous-like and colloid fluid.

Inflammatory exudations are *fibrinous*, *albuminous*, and *serous.* Fibrin-

ous exudations appear as coagulations (Gerinnungen), containing the above-mentioned elements in various proportions spread through a fibrinous network, or hyaline mass. Such exudations on membranous surfaces are called croupous, and are remarkable for their extent, the rapidity of their deposition, their abundance, and the exhaustion of vital power which they occasion. The *albuminous* is a clear, colourless, synovial-like exudation; or when granules, nuclei, and cells are present in it, an opaque, troubled, thickish, whitish-yellow, creamy fluid. Under this head belong purulent exudations, the blastema of tubercle, and of typhus- and cancer-masses. *Serous* exudations are either simply serous, containing little albumen; or albumino-serous, thick, synovial-like, rich in albumen, or fibrino-serous.

We have already said that the *membranous formation* which takes place subsequent to the exudation in the substratum of the exudation process, is to be distinguished from the exudation proper. *Pseudo-membranes* have been hitherto improperly considered as a part of the exudation. They result from the development of the areolar substratum (Bindegewebe Substratum) into cellular growths. In serous membranes, for example, appear round, oval, spindle-shaped cells $\frac{1}{50}$ mill. diam., with nuclei $\frac{1}{100}$ mill. diam., which grow into soft, villous layers, papillary granulations, and channelled, branched, anastomosing folds, giving to the inflamed membrane its well known dull, flocculent appearance. The serous membrane also at the part loses its fibrous texture, and assumes an hyaline, gelatinoid condition. The new vegetations at first take the form of a simple or areolar lamella, or of a trellis-work; which again gives birth to new villous and papillary cell-masses; and thus the layers are formed one over the other. The materials for this continued growth are undoubtedly essentially derived from the serous membranes through the simultaneous development of a new vascular system in it; they may, however, in part be derived from the exudation in contact with the innermost layers of the new growth.

Hence this pseudo-membranous constituent is not a plastic, organizable part derived from the exudation, but it grows out of the same substratum as the exudation, is one with it.

The same process of cell-growth takes place in connexion with purulent exudations, giving rise, as in healing ulcers and in wounds, &c., to *fleshy granulations.* These are formed of cell-layers, which grow into papillary, wart-like masses, out of which again spring new cell-masses, the deeper layers in the meantime being converted into vascular areolar tissue. The pus-formation ever present on such granulating surfaces takes its source in the exudation, which is poured out of the newly-formed vessels of the granulations. It corresponds to the exudation which so often occurs on the inner surface of serous sacs during the growth of pseudo-membranes on them, and which combines with, and increases the quantity of, the original exudation.

Hence, then, the exudation proper of inflammation, its cells, &c., are incapable of further development; pus, therefore, is an excrementitious product. New texture-forms, the results of inflammation, arise through the growth of the areolar substratum into cells, and by the fusion of these into hyaline and fibrous-areolar textures. The inflammation, therefore,

can only be looked upon as an exciting cause of the new-growth, not as a necessary ingredient of it, for the new-growth may take place without any perceptible signs of concurrent inflammation. Moreover, the new-formation and the exudation hold neither quantitative nor qualitative relations to each other; the blastematous contents of the exudation, for instance, may be very abundant and the new-growth but slight, and *vice versâ;* and the quantity of the exudation is no measure of the amount of new-growth.

From the outline here given, our readers may form an idea of the new doctrines now promulgated by our author regarding inflammation, and of his new method of treating the subject. We wish that our space would permit us in like manner to run through his history of blastema, the growth of cells, and their development into tissues. This chapter is one of the most interesting in the work, but it is not readily mastered without the aid of woodcuts, and we fear would scarcely be made comprehensible by mere verbal description.

The extent to which we have already allowed our remarks to run warns us that we must bring them to a close; but we cannot do so without once more expressing our high approbation of the contents of this volume of Rokitansky's on General Pathology. We have no hesitation in proclaiming it, in our opinion, to be the best elementary treatise on general pathology with which we are acquainted; the more we have examined it, the more firmly have we been confirmed in the opinion. It is just the work which we should have desired to see produced by a man of Rokitansky's vast experience, and we are free to confess it is a work which we scarcely expected to see him produce. High science is here rendered comprehensible to, and made available for, the purposes of the practical man; the subject matter, difficult enough in itself, is not made, as too often happens in like cases, incomprehensible to the general reader, by being smothered in an overwhelming amount of learning. The author has stuck truly to his text: "Ich bemühte mich, strenge an dem Faktischen zu halten;" he has kept himself strictly to a detail of facts. To attain a knowledge of the *facts* of general pathology, the student will find no easy task.

From what we have said, we need perhaps not add, that we hope to see this work in an English dress. The publication of the former editions of Rokitansky's work exercised very great influence over the pathological literature of Germany and of this country; the publication of this edition will, we trust, exercise a like influence, an influence from which we cannot but anticipate happy and beneficial results.

W. O. Markham.

Review IV.

1. *Principles of Human Physiology, with their chief applications to Psychology, Pathology, Therapeutics, Hygiene, and Forensic Medicine.* By W. B. Carpenter, M.D., F.R.S., F.G.S., &c. Fifth Edition.—*London*, 1855. pp. 960.
2. *Elements of Psychological Medicine.* Being an Introduction to the Practical Study of Insanity. By Daniel Noble, M.D.—*London*, 1853. pp. 356.
3. *On the Influence of Education and Training in Preventing Diseases of the Nervous System.* By Robert Brudenell Carter.—*London*, 1855. pp. 438.
4. *Psychological Inquiries.* By Sir B. Brodie, Bart.—*London*, 1854. pp. 264.
5. *The Senses and the Intellect.* By Alexander Bain.—*London*, 1855.
6. *The Principles of Psychology.* By Herbert Spencer. — *London*, 1855.

It is an opinion we hear often expressed, both at home and abroad, that the English mind, absorbed in practical pursuits, has become singularly unfit for any kind of philosophical speculation. This opinion, it is necessary to admit, is not wholly devoid of reason. That there is any natural deficiency, indeed, in our mental constitution for purely speculative researches, we feel justified, even on mere historical grounds, in denying. It was from England that the scholastic philosophy drew its acutest disputants,—in England, that the inductive method first enunciated, theoretically, its great and fruitful principles,—in England, that the most systematic attempt was made (in the writings of Hobbes) to build up a complete body of scientific truth upon a materialistic foundation,—in England, that the science of ethics and the spirit of criticism received, in the seventeenth century, at once its deepest and most enduring characteristics,—and in England, finally, that an epoch was made (by the writings of Locke) in the whole procedure of psychological and metaphysical investigation.

Notwithstanding all this, however, it must be confessed that *since* the time of Locke the philosophic spirit has been, to a large extent, dormant amongst us. Individuals there have been, well fitted to remind us that the power of speculation is only slumbering; but no great national school of philosophical thought, either of one kind or another, has even begun to show itself, amongst all the mental activity of the last and the present century. Perhaps the fruitfulness of physical investigation in this country has contrasted but too strikingly with the general unfruitfulness of metaphysics; or perhaps there may have been a sort of unconscious, intuitive perception in the practical English mind, that the one real method has not yet been evolved which could give to mental researches the certitude, and consequently the value, which we have now learned to demand in all the walks of pure science.

In Scotland, indeed, a school of philosophy—based, in the main, on healthy convictions, and nursed by a sound antagonism to scepticism—sprang up, and flourished for a time as though it had found a truly congenial soil. But even this school—always timid in its character, confined in its range, and greatly wanting in the power of practical application—has now well nigh passed by. Amongst all the professors of that country, there is only one name that appears likely to go down to posterity as having added anything to the range of human thought. And even Sir William Hamilton (the author to whom we allude), though unrivalled as a critic, hardly emulated as a logician, and seldom surpassed in the knowledge of the history of speculation, has confined his efforts so much to the *formal* side of philosophic methodology, that his writings have not availed, in any great degree, to rouse the mind of his country up to any decisive effort in the way of broad and earnest reflection upon the great moral problems of the age. Scotland is still largely engaged, nationally speaking, in verbal disputations, logically as acute, but morally as fruitless, as were the battles of the middle ages.

Psychology, or the science of mind, has thus for some time occupied a wholly anomalous position amongst us. On the one hand it is felt, that a clear and comprehensive knowledge of mental operations is a great and pressing necessity. All the kindred sciences, in fact, appeal to psychology for first principles. The moralist looks here to gain light on the nature and authority of conscience; the legislator, to find some guide for estimating the degrees of criminality in doubtful cases; the educationist, for data on which to base an intelligible scheme of mental culture; the physician, for guidance in the proper treatment of insanity; and lastly, the theologian looks here for aid in tracing the essential characteristics of man's religious nature, and the avenue by which his mind can soar to the contemplation of the infinite.

With all these inquiries, however, directed to the subject—with all these eyes waiting upon it for light—the science of mind is felt to have been, for some time at least, singularly unproductive. It does *not* solve the problems of the age, or appear to give much aid in solving them. It borrows from other sources more light than it lends to them. And even when, as we sometimes see, a formal attempt is made to consult it on subjects with which it ought to stand in the closest connexion,* every one is compelled to confess that the result comes to hardly more than a series of commonplaces, which leave the whole question exactly where it was before.

Now, to judge by past experience, we should naturally conclude, that the unfruitfulness of any science (if it be truly a science) must arise from a false method of investigation. The science of nature was unproductive while pursued on the principles of the ancient philosophy; investigated by the light of the *Novum Organum*, it has become the handmaid well nigh to every human desire. It is important for us, therefore, to look for a moment at this one point, and see what precise methods of psychological research have been most in vogue during the last century.

1. *And, first, we find the purely speculative method largely followed by various of our older English writers, and still more largely by modern*

* The Relations of Psychology and Theology. By Dr. Alliott.

German ones. The attempt which rational psychology, as it is usually called, has constantly made, is, first of all *to think ones-self*, by the pure force of reason and reflection, into a clear conception of the nature of the human soul; and then to deduce from its fundamental characteristics thus determined, the whole catalogue of its powers, capabilities, and attributes. This attempt, we may certainly say, has hitherto been quite as fruitless as was the attempt made by the ancient philosophers to *think themselves into the secrets of nature*, and then apply their thoughts to the construction of a complete natural philosophy.

We do not mean it to be inferred from this, that all speculative thinking is alike worthless and unproductive. All we mean to say is, that where a direct objective material of research exists—one to which we can have immediate access; which presents actual facts and phenomena to our view, and which can be interrogated by inquisitive observation,—it is folly to neglect these patent facts, and then to retire into the recesses of our own minds to find the laws we seek for *there.* If the subject of research be one which presents no tangible material at all; if it be something which can only be grasped and realized *in thought;* then thought may undertake to investigate it. Take any purely metaphysical question—such as the nature of time, or space, or power, or causality—and all we can do is to show the relation of such questions to the laws and possibilities of thought itself. So it is with regard to most moral and religious questions—such as the existence of a God, or the immortality of the soul, speculatively considered. Here are subjects of research which present no direct and accessible phenomena apart from the process of thought by which we realize them. Thought, therefore, must do its best to rise from the visible realities around us, or the felt realities within us, to a rational or moral certitude on such matters. But it is not so with regard to the human mind. Laying aside all hypothesis on the nature or essence of the soul, we have a series of phenomena presented in history, in our observation of others, in the facts of our own internal consciousness, that are perfectly inexhaustible as illustrations of mind, its laws, and its characteristics. The facts of sensation, of emotion, of thought, of imagination, of human action, wherever or however they present themselves, all form materials of investigation to which we are as well able to direct our powers of observation and analysis as we are to the outward phenomena of nature herself.

Convinced of this truth, many other psychologists have adopted—

2. *The purely empirical method of research.*—Dugald Stewart, for example, laid great stress upon the idea of reducing psychology to an *inductive* science. Many of the French philosophers, and their followers in England, have done the same. But in the case of nearly all these writers, the inductive method, properly so called, has been but very imperfectly realized:

"They thought" (to use the words of Fortlage, in his 'System der Psychologie'). "that to write a psychology, it was only necessary to look into the soul as into a peep-show, and to put down simply what showed itself. It was just the same kind of procedure as if, in investigating a theory of storms, we were to give as near a description of them as possible; designate all the forms of the lightning flashes, put all the rolls of the thunder to musical notes, and, above all things, add plenty

of information about remarkable and curious storms which have taken place here and there."

In these few words, Fortlage has just touched the evil and imperfection under which our empirical psychology has laboured. *Observation* there has been in abundance, but very little *explication;* classifications have abounded, some more and some less complete, but we have had very little disintegration of individual phenomena into their simple elements. Lists of mental faculties have been carefully made out and labelled; and then the knowledge of these lists has been allowed to stand in numberless instances for the knowledge of the thing itself. To take an illustration of this method: let us suppose that any one endeavouring to investigate philosophically the nature of vegetable productions, were first to divide them into their component parts—the root, the stem, the leaf, the flower, the seed, &c.; and then, having described the varieties of all these separate parts, were to consider the work of investigation finished, and the knowledge derived from it complete. How imperfect, we at once see, would be the insight gained by this procedure into the real nature of the object under research. To gain any philosophic insight into it, it would be necessary to acquire an accurate knowledge of the chemical elements of the vegetable world; to have true ideas concerning the process of cell-formation; to know something in brief of all the wondrous operations which science has revealed in connexion with the physiology of plants. It would be necessary, moreover, to have some acquaintance with the plant as an organic unity; to trace its development from the seed-germ upwards; to understand its metamorphoses; in a word, to *analyse the whole thing into its primary elements and simple functions,* instead of giving a mere enumeration of its constituent parts.

The case of psychology is precisely parallel. A mere descriptive psychology is just as imperfect, scientifically considered, as a mere descriptive botany. It comes after all to little more than a mere catalogue of terms; and tends in the long run, when put in the place of true science, to become as dry, as formal, as dogmatic in its nature, and as circumscribed in its applications, as are the barren deductions of mere *à priori* speculation.

Neither is the matter helped forward by the aid of phrenology. With exception of the one fact, that phrenology has called attention to the physiology of the brain and the nervous system, its whole procedure has exhibited the crudest possible attempt at unravelling the web of our complex mental phenomena; while its effort to read the faculties on the surface of the cranium has never risen above a species of practical tact, which, in the hands of a keen observer, might give rise here and there to a few plausible conjectures, but could never reach the very lowest idea of a true science of the human mind. As phrenology was based originally upon an imperfect and immature knowledge of the nervous system, so the advancement of modern physiology in this direction has left it standing like an old landmark, which points out the ignorance rather than the knowledge of the times in which it flourished.

While these isolated efforts have been made to penetrate into the region of mind, and discover the laws of its operations, the nature of science itself, and the order in which the various branches of it develop themselves, have been gradually becoming more clear to the human reason.

It has now been distinctly apprehended, that no single science whatever is or can be isolated from all the rest; that those which have the fewest elements to work upon, and which start from the simplest ideas (such as number, space, force, &c.), arrive soonest at their perfection; and that the results of each, as they are unfolded, form the starting-point for that science which stands next in the scale of development.

Thus the results of arithmetic form the basis of geometry; while the results of geometry give us the starting-point for a science of dynamics. In the same way, chemistry, basing itself upon the sciences already investigated, gives the primary data for a systematic research into the laws of organized life—that is, for a scientific physiology; and physiology, when it reaches its higher walks, leads us upwards to the human soul, as the goal of its noblest efforts.

This truth of the co-ordination of the sciences, which has been for some time tacitly gaining ground amongst the fixed convictions of philosophic minds, has naturally thrown psychological research back upon physiological principles; proving to us beyond a doubt, that we need the data which the lower science can supply before we can give a proper foundation to the higher. Accordingly, in looking over the more recent attempts which have been made to advance and to fructify psychological research, we find that a very large proportion of them come either from the side of physiology, or from the practical necessity of seeking more definite knowledge in the treatment of insanity. A series of facts have thus come to light in connexion with the structure, functions, and diseases of the nervous system, which have already begun to carry the precision of the positive sciences into the region of psychological research. In estimating therefore, as we propose to do, the position and prospects of modern psychology, it will be necessary for us, first of all, to give a succinct and popular abstract of the most important conclusions thus arrived at.

The effective study of the nervous system takes its starting-point from the grand discovery of Sir C. Bell, that the whole of the nerves spread in infinite ramifications through the body, are of two different orders, and perform two distinct but related functions. One portion of them, he showed, convey impressions from all points in the circumference of the human frame to the centre; the other portion convey impulses from the centre to the various parts of the circumference. The one portion, therefore, are properly termed nerves of sensation; the other, nerves of motion: the one, afferent; the other, efferent. In this discovery we have the first idea presented to us of the nervous system as one great organ of action and reaction; as the link between the soul and the world; the instrument by which outward realities around us affect the mind; and by which the mind, as force or will, reacts in its turn upon the world without.

For some time it was imagined that every nervous impression necessarily reached the sensorium, and that every external movement, therefore, was made *consciously* in obedience to the will. Against this view, however, many well known facts began to raise well-founded doubts. It was observed, for example, that in cold-blooded animals, such as frogs and turtles, the operations of hopping, crawling, &c., could be very well performed for a time after the severance of the head from the body. This was a sufficient proof that, in their case at least, the motor impulse could

not come from the brain, but must reside in the nervous apparatus of the spinal cord. The researches, thus commenced, were carried systematically forward by Dr. Marshall Hall, until it was completely established, that in the human subject, as well as in the lower animals, there is a distinct and separate centre of nervous action in the spinal cord; and that numerous movements take place, the origin of which is not in the brain, nor in any of the sensory ganglia beneath it; but simply and solely in the spinal cord itself. These movements, of course, are performed wholly unconsciously (like the act of breathing in sleep or in apoplexy); they are the organic response, as it were, to certain physical stimuli, necessary equally for the preservation and the well-being of the human individual: in other words, they are *thrown back* from that part of the nervous system to which the stimulus especially applies; and on account of this particular characteristic, have received the name of REFLEX ACTIONS. Here, then, we see already how decidedly the nervous system in its unconscious operations has begun to claim for itself the origination of many phenomena which were before attributed to the direct effort of the mind, or the will; and we can judge from this fact alone how many false observations in psychology are corrected by the simple comprehension of the laws of reflex activity.

The phenomena of reflex action, however, were not allowed to rest here. It was seen that the principle, once established, in relation to the spinal cord, might be carried out still further, and throw light upon many other phenomena hitherto sufficiently perplexing. Dr. Carpenter took up the investigation where it was left by Dr. Marshall Hall, and has given us, particularly in the two last editions of his 'Human Physiology,' a very full and detailed account of the further conclusions at which he has since arrived. It is frequently supposed that the spinal cord, if traced upward, communicates immediately with the cerebrum, so that actions and re-actions pass directly from the one into the other. This is shown, by mere anatomy, to be erroneous. Instead of communicating with the cerebrum, the spinal cord is found to merge into a series of ganglionic masses, which form the centres of the nerves of sensation. These sensory ganglia are not, as was formerly supposed, mere appendages to the cerebrum; they are *distinct centres* of action and feeling, analogous to the entire "brain" of insects and mollusks, and form therefore, in regard to their functions, the subject of a distinct investigation, apart from the spinal cord on the one side, and the cerebral hemispheres on the other. It is in the fuller investigation of this second and intermediate centre of innervation, that Dr. Carpenter has added so materially to the elucidation of the whole subject of cerebral physiology.

The "sensory ganglia," as Dr. Carpenter has shown, hold an intermediate position as regards their functions, as well as their location, between the spinal cord and the cerebrum. Like the intellectual and voluntary activity of the latter, their operations are connected with *consciousness;* but, like the reflex activity of the former, they take place without forethought, purpose, or any control of the will. From this peculiarity they have received the appellation of CONSENSUAL *actions.*

Many simple examples of these actions might be readily cited. The start produced by a loud and sudden noise; the contraction of the eye-

lids, to prevent a too dazzling light; the act of sneezing, and the sensation of tickling; the process of sucking, in the young of the mammalia; these are a few of the most familiar instances of the consensual actions—actions, that is, bearing the double character of being attended with consciousness on the one hand, and yet being wholly involuntary on the other. They bear, it will be seen, a very close resemblanse to the purely reflex actions before explained; and indeed may be called reflex, only with the further addition of our being fully conscious of their existence at the moment in which they take place.

The most important conclusions drawn from the phenomena of the consensual actions may be summed up as follows:

We learn from them—1. That many actions are performed by us, and performed *consciously*, which are not in any way the result of purpose, forethought, desire, or adaptation, and which therefore cannot be cited as any illustrations of our voluntary activity.

2. That there exists in the mechanism of the ganglia a pre-arranged system of impulses, which urge us to the performance of various functions, adapted to answer important purposes in the physical economy of our being, independently of anything connected with our own personal will or intelligence.

3. A third conclusion is—that the sensory apparatus is that part of our nervous system which supplies the immediate force, not only for the actions above alluded to, but for *all kinds of voluntary action* as well; that the will itself, in fact, can only act upon the muscular system through its intervention; that every human action, accordingly, viewed at one remove, is really automatic, because the sensory ganglia operate upon the nerves belonging to the muscular system, in a mode of which we are wholly unconscious at the time, and impel them to certain results through an impulse blind in itself, although set in motion by a voluntary effort derived from the brain. This explains the reason why rapid actions are often performed by us with a view to certain ends, the individual movements of which we do not at all follow with the understanding and the will. The will only contemplates the desired end itself; the automatic action of the sensory nerves instinctively supplies the method of accomplishment.

4. Another very important conclusion is—that the sensory apparatus, lying midway between the impulses of the world without, and the action of the intellect and will within, may be set into motion, and that similar motion, either by the one or the other. For example, a sensation, and the idea of a sensation, will often excite the very same consensuous movements. By thinking of a nauseous dish which has disgusted us, we may renew all the inconvenience we experienced from it. Many persons faint away by imagining vividly a surgical operation. The whole working, in fact, of the mind, and of its ideas upon the body, receives a new light as soon as we have well comprehended the independent position and the automatic action of the sensory ganglia. All the phenomena of hypnotism and electro-biology (as it is termed) are manifestly explicable on this principle. They all point to a great automatic centre, which can mould human action with the most perfect adaptation to definite ends, without being controlled by the will, and which may be excited, more-

over, to do so either by impulses directly from without, or by strong ideas operating downwards upon it from within.

5. One more point we may mention is—the light thrown by the consensuous movements upon the nature and philosophy of *instinct.* Those animals (chiefly insects) which are, as it were, all instinct, are known to possess simply a highly perfected sensory apparatus, without the superaddition of any cerebrum whatever, properly so called. Hence the rapidity, the perfection, the beauty, the adaptation of their movements, impelled, as they are, neither by conscious ideas nor by volition, but by a highly-organized automatic machinery. The consensuous movements in man are exactly analogous to this. We perform involuntarily, and without reason or forethought, many actions which are as complex in their nature, and as curiously adapted to certain ends, as does the bee when it constructs its hexagonal cell, or the spider when it weaves its snares for its enemies. Thus nearly all the instincts, both of man and the lower animals, become, in fact, simple examples of the reflex action of the sensory ganglia.

These, then, are some of the conclusions which have been drawn from the physiological investigation of this portion of our nervous system. Much more will undoubtedly be elicited in process of time; but what we have already presented sufficiently proves that, in any analysis of our complex mental phenomena, we should be liable to many errors and false conclusions without the light that flows from cerebral physiology; and that, in investigating a large number of important facts, we derive an essential service from the knowledge now possessed of the independent action of the reflex and the consensual centres of human activity.

Whether a similar light will be thrown upon the working of the emotions, remains to be seen. In the highly intelligent and scientific work of Mr. Noble on Insanity, we are directed to a series of physiological facts bearing very closely upon the elucidation of this part of our nature. He has there stated various grounds for the belief, that the emotional sensibility has a distinct centre amongst the ganglia of the lower brain; and shows that by well adapted experiments and observations we may succeed eventually in isolating, as it were, the activity of the emotions, just in the same way as Dr. Carpenter has done with regard to the sensory apparatus. If this theory be verified, we may expect a new and most welcome light to be shed, through the aid of physiology, accompanied by a series of well-directed experiments, upon that portion of our mental constitution, which has hitherto been marked, even amongst professed psychologists, with the greatest amount of indistinctness and confusion.*

To return, however, from this short digression on the emotions, we must proceed somewhat further with our exposition of the various centres of nervous action. Two have already been pointed out; those which originate purely reflex and unconscious movements; and those which give rise to conscious but yet involuntary actions, prompted by certain guiding sensations. It is hardly necessary now to dwell at any length upon the

* In addition to the work mentioned at the head of this article, the student might also consult 'Three Lectures on the Correlation of Psychology and Phrenology,' delivered by Dr. Noble, at Manchester.

third great centre of innervation, which exists in the cerebrum proper. All the experiments of modern physiology go distinctly to prove that the physical organ attached to the intellect and the will lies here. This third centre of nervous action, moreover, operates in perfect co-ordination with the other two. Just as an impulse from without passes upwards, first through the spinal cord, then to the sensorium, where it becomes an object of consciousness, and lastly, to the cerebral hemispheres, and is there attended by the genesis of actual ideas; so an idea or volition, beginning its physical career in the brain, passes down again to the sensorium, sets the automatic apparatus in motion, and finally reacts, through the instrumentality of the muscular system, upon the world without; the whole system thus showing the most beautiful and harmonious co-ordination between thought itself, the material organism through which it is conveyed, and the order of universal nature in the midst of which we are placed.*

We may regard it, then, in fine, as a point in our knowledge of humanity which has been definitely gained by the researches of modern physiology, and which can now be set down within the region of positive fact,—that there are *three main centres of nervous action*—the spinal cord, or the excitor-motor system; the sensory ganglia, or the consensuous system; and, lastly, the cerebrum proper, which is now known, as far as any direct evidence can reach the case, to be the physical laboratory in which our notions, ideas, and voluntary efforts first manifest their action on the world without.

In the 'Elements of Psychology,' by J. D. Morell, these conclusions, which have been recently developed on the side of physiology, are employed for *generalizing* the study of mental philosophy, and bringing it more directly into co-ordination with the science of nature. The views there presented are substantially as follows. Comparative physiology has brought to light the fact that, physically speaking, there is a regular progression visible throughout all organized existence. The vegetable world exhibits already the phenomena of life and growth—i. e., of self-development from a primary germ in the way of cell-formation. Proceeding upwards, we find that the limits between the vegetable and the animal kingdom can hardly be defined; and that when we once arrive definitely at the lower forms of animal life, there is still an infinite gradation in the structure and perfection of the nervous system, developing one instinct and one faculty after another, till we come to the very limits of humanity. Once within the region of humanity, we see the law of progress still going forward, and exhibiting a new series of stages, from the mere sensitive life of the infant, up to the loftiest forms of reason and will.

If, then, we can trace a regular progression throughout nature, in carrying out the laws of organic life—from the first effort at cell-formation up to the highest and most complicated cerebral machinery—then, it is argued, there must be some rational connexion running through the

* To those who wish to see many of these results combined in easy and graceful dialogue, together with various practical and moral conclusions drawn from them, we recommend the perusal of Sir B. Brodie's 'Psychological Inquiries,' as containing the fruits of much observation, matured by a familiarity with such topics derived from long and daily experience.

whole. This connexion is seen in the fact, that there is a constant tendency throughout all being to advance from the more material form of existence to the more immaterial; from the more instinctive regions of intelligence to the more rational; from the passive to the active; from the dependent to the independent; from complete identification with nature to the higher life of a self-determining individual. This law, then, which we see at work throughout nature universally, holds good equally in the whole process of our mental development. The principle of life, which acts unconsciously, though with perfect adaptation, in the vegetable world—which operates blindly, according to mere instinct and impulse, amongst the lower animals—which gives rise, not only in them, but also in mankind as well, to reflex activities beautifully adapted to subserve the purposes of self-preservation,—this principle of life is at length gifted with self-consciousness in connexion with the superior organism of the brain, and the consequent operation of the higher faculties; and being gifted with self-consciousness, still proceeds onward to the development of the highest reason, the purest emotions, and the most perfectly self-regulating will. The problem of psychology, accordingly, as here viewed, is to show how the laws of nature, assuming the form of the laws of self-conscious mind, accompany the soul onwards through the various regions of instinct, of sensitivity, of intuitive perception, of ideal representation, &c., up to the highest regions of reflective thought and voluntary activity.

In this way mind comes to be viewed as an organic unity, developing successive powers like every other organism; and *the science of mind*, no longer standing alone, takes its place in the regular series of the natural sciences, depending for its data upon the results of those which have gone before.

This point of view has been taken up by Dr. Laycock, and made the basis of renewed investigations into the functions of the brain. Starting with the now admitted phenomena of reflex action, and granting that such action must take its rise from the vesicular matter of which the ganglia are composed, he goes back one step further in the inquiry, and asks, How or by what active principle is it that this vesicular organism is constructed, and so constructed as to produce such marvellous results? How is it that a material machinery should exist within us which, when set in motion by some stimulus from without, should have all the effect of the most perfect contrivance and forethought? What is the principle of intelligence by which it acts, independent as it is of our own conscious volition? Theories of all kinds, he shows, have been formed in reply. Plato, in his time, maintained the existence of a *plastic power* in nature, which forms everything adaptively for its position and circumstances. The ordinary way of cutting the knot at present is by introducing a *Deus ex machinâ* and attributing the constructive power and intelligence shown both in the mechanism and functions of the ganglia and nerves, to the direct, separate, and individualized operation of the Deity; which comes, in fact, to a sort of modified doctrine of "*occasional causes.*"

With these hypotheses, however, Dr. Laycock thinks *inductive philosophy* has nothing to do. It treats only of palpable phenomena, and the method of their operation. It seeks to find some expression of the

laws of nature actually at work around us, independently of any theory respecting the individual exertion of Divine power in carrying them on.

Viewing the subject in this light, one plain fact presents itself to us, that there is inherent in the primordial cell of every organic existence, and through all its subsequent growth, *an immanent or abiding law of development,* which moulds matter into forms of the most exquisite beauty, and constructs out of it machines adapted to all the peculiar wants or possible contingencies of the individual. Speculation may account for this abiding law of plastic activity in a variety of ways: there may be, and have been, numerous theories as to its exact relation to the great First Cause, the all-sustaining Mind of the universe; but apart from speculation, here is the fact palpably presented to us, that a principle of life exists, and exists abidingly, in the primary cell and its subsequent development, which acts at every instant of each creature's organic growth, and acts, too, with all the effect, all the outward manifestation, and all the final results, of intelligence—that is, of complete adaptation of means to the most desirable ends. Whether we choose to call this a principle of intelligence or not, must of course depend upon our definition of the term—i.e., whether or not the word "intelligence" ought to be employed for any kind of activity which is unaccompanied with self-consciousness. That there is a principle at work, however, in every atom of organized matter which produces intelligent *results,* is a fact which, speculation apart, admits of no dispute.

Having considered the plastic principle that resides in every organism, Dr. Laycock next goes on to show that there must be a direct connexion between the construction of organisms, and their use when constructed; and that we have no right, on the principles of the inductive philosophy, to wander away into speculations, and imagine two distinct intelligent agents, to account for these two so closely affiliated purposes. The intelligence, for example, that develops the ganglia in the head of the bee from the primary insect cell-germ, must, he thinks, be fundamentally the same as that which prompts it to construct a comb with the most perfect mathematical proportions. Either we must attribute both processes to an extraneous power, which renders the bee simply a living machine, or we must attribute them both to an immanent principle, that operates without self-consciousness, indeed, yet individually, in each separate organism.

The operations or functions, then, of what we may term the *unconscious principle of intelligence* in organic nature, may be summed up in a few words:—

1. It moulds matter into living organisms according to a fixed, predetermined plan, and adapts them by the most certain intuitive logic to the purposes for which they are constructed. 2. It moves and regulates these living machines, according to fixed and unchanging sequences, in such a way as to promote the welfare and continued existence of the individual. 3. In animals endowed with self-consciousness—that is, in man—it acts upon the vesicular matter of the brain, and excites changes there; the results of which changes, when presented to the consciousness, constitute some of the most important phenomena of thought.

The next step, according to Dr. Laycock (after this elucidation of

what he has termed the unconscious principle of intelligence), is to show the relation which this unconscious principle bears to the conscious mind. Are we to regard them as two distinct intelligent agents; or can we identify them as being really and fundamentally one and the same? To this question Dr. Laycock has addressed himself at some length, and shows with great skill that it is impossible to separate into two categories the ganglionic formations, which subserve the *instinctive* life of men and animals, and the cerebral formations, which subserve *conscious intelligence.* He has proved, in fact, that the brain is, strictly speaking, a large ganglionic centre, only superior to the rest; that it is subject to the same laws of development and growth; that it accumulates substrata, and, consequently, power of function, in the same way as the rest of the nervous system; that it responds to stimuli in the same manner, and is strictly subject to reflex actions;—in brief, "that the two forms of mental manifestation—the voluntary and the involuntary—have a common origin and a common substratum, and *that the human mind is none other than the unconsciously working principle of intelligence individualized, become conscious of its own workings in the cerebrum, and deriving its ideas from its own constructive or material changes in the organ of mind.*"

In the views thus put forward by Dr. Laycock, we certainly see the most complete co-ordination established between psychology and physiology in the widest extent. All the facts and laws of physiology, beginning with the simplest notions of cell-formation, are brought into play, and then traced upwards in one direct line of progression, till we are landed amidst the most remarkable phenomena of mind and the general laws of its operation. Whether all the particular conclusions which Dr. Laycock has drawn, in his analysis of the subject, are correct, it can hardly be our object here to examine. The point we are most anxious to notice is, the new direction which this kind of research must inevitably give to psychology as a science, in extending the operations of mind beyond the limits of consciousness, and thus drawing the activity of the soul and the activities of nature into one broad and scientific generalization. Doubtless, it will require both time and labour to work out this generalization, but no system of psychology can henceforth prove satisfactory that does not at least *attempt* to solve the problem thus arrived at, and to interpret the numerous phenomena which bear so directly upon it.

In following out this process of investigation, it is extremely important to separate the whole inquiry viewed as a question of facts, from any speculations we might be tempted to enter into respecting the first creative Power from which every mode of intelligence alike emanates. All we have to do is to investigate—(1) the changes which the immanent principle of life operates in matter, moulding it to certain great and wise purposes; and (2) the changes which take place in our states of consciousness consequent upon these material adaptations. We want to know, in short, whether these changes can be reduced to any distinct and intelligible *laws*, so as to cast new light upon mental phenomena, and the relations of self-consciousness to our physical organization.

No doubt all such attempts will be met, more or less, by the old watch-cries of *materialism* and *pantheism;* but we protest in the outset

against any such charges, not only as hasty and ill-judged, but perfectly retortable. It may seem at first sight to be the part of a devout and earnest Theism to maintain the theory of a direct Divine intervention wherever adaptation exists in nature apart from the human will and intelligence; but a very slight amount of further analysis shows us how closely this theory links itself on to a pantheistic result. Pantheism, fundamentally speaking, is the identification of God and nature—sinking the idea of a divine Personality in the category of physical law. And it is hard to say what can more readily prepare the mind for this identification, than the habit of regarding the growth of every plant, the instinct of every animal, the impulse underlying all the unconscious process of human activity, as so many direct modes of the Divine operation, and expressions of the Divine Intelligence. It is assuredly an equally short road to a pantheistic conception of the universe, whether we bring the works of God down to a unity with the laws of nature, or whether we elevate nature upwards to the Divinity. Let *science* follow her path unrestrained; let her cultivate her own region—that of *universal law*—untrammelled by speculations either of one kind or another; and moral reflection will be sure in the end to vindicate for itself the truths of theology, and that upon the only firm and immovable grounds from which a true and all-influencing theology can take its start. The more the regions of physical law and moral order are separated, the more certainly will science advance on the one side, and the more will theology be rendered secure from every pantheistic tendency on the other.

The most recent works of any magnitude which England has produced on the subject of psychology are, 'The Senses and the Intellect,' by Alexander Bain; and 'The Principles of Psychology,' by Herbert Spencer. The former of these works, though starting strictly from the psychological point of view, is conceived in a spirit altogether different from the Essay of Dr. Laycock, above referred to. The object which the author aims at is simply to give a natural history of mental phenomena, as far as the senses and the intellect are concerned. There is no attempt at any generalization between organic life as existing in mind and nature; no distinct co-ordination between the phenomena of instinct and intelligence; no inquiry into the nature of the agency by which the mechanism of the nervous system is constructed and worked. All topics beyond a mere enumeration and exposition of patent phenomena are avoided, as though they had no place in the discussions of mental philosophy. To us this appears to be a serious deficiency in a work evidently intended to be as complete as possible on the positive side of the question. The whole of the region lying between the unconscious and the conscious operation of the soul, is one fraught with the most interesting phenomena—phenomena, too, on which we are anxiously looking for more definite knowledge, as the result of physiological and mental inquiry. If the bee constructs its cell in the highest style of mechanical skill, it is certainly not by any means alien to the spirit of inductive philosophy to inquire into the nature and the laws of the *intelligence* by which such acts are prompted. So, also, if the human individual perform unconscious actions under the promptings of certain nervous centres—actions having the most perfect adaptation to wise and necessary ends, it is not the part of a true

mental philosopher simply to accept this as an ultimate fact; but rather to seek some larger generalization, some deeper law, by which such facts may be co-ordinated with the other phenomena of mind and nature. For, even granting that we must stop *somewhere*, before we reach the *causa causarum*, yet so long as myriads of facts like those referred to lie around us unanalysed and unexplained, we cannot be said to have made any real progress in a *philosophy of mind*, although we may have made a very extensive classification of its more obvious phenomena.

Mr. Bain's work must be regarded, in fact, as an industrious, intelligent, and profuse colligation of facts, physiological and mental; one of those "amassing of instances" which always prove highly valuable as the precursors of inductive science, but which certainly only come up just to the threshold of science itself. Of the 600 pages, of which the work consists, above one-third already exists, in one shape or another, in the various treatises on physiology; so that it may be regarded as containing a very fair digest of what is already known, *as fact*, of the relations between the mind and the body. With regard, however, to the conclusions drawn from these facts in the explication of mental phenomena, we do not think that they are uniformly trustworthy. Many things are explained on physiological principles, which have the appearance of being direct deductions from known facts, but which are, in reality, pure speculations. Such are all the accounts given of the rise of the ideas of extension, form, size, &c., by the aid of muscular movements; such, also, is the physiological theory propounded respecting the revived impressions of the senses. With regard to this latter point, especially, physiology is as yet in its infancy; we know next to nothing of the physical substrata of our ideas, or how they pass in and out of consciousness. This is a field of research on which very little can as yet be said with any certainty; and anything that is said, should certainly be qualified with expressions that denote anything rather than confidence or certitude.

With all this, however, to set off on the other side, Mr. Bain's work is a decided advance upon what has preceded it in the natural history of mental phenomena. He has abandoned the old method of dividing the mind into so many definite faculties; has seized the unity of its operation; elucidated by the aid of physiology the primary and spontaneous stages of mental activity; shown the germs of volition as existing in the instinctive impulses of the nervous system; and gone some way, at least, into the explication of the higher mental phenomena, as resulting from the combinations and associations of our primary ideas according to appreciable laws of suggestion.

The volume recently published by Mr. Herbert Spencer, entitled 'The Principles of Psychology,' forms altogether a contrast to that on which we have just been commenting. While Mr. Bain is conversant chiefly with external facts, and never penetrates, indeed, very far beneath them, Mr. Spencer is equally remarkable for his search after first principles; for his acute attempts to decompose mental phenomena into their primary elements, and for his broad generalizations of mental activity, viewed in connexion with nature, instinct, and all the analogies presented by *life* in its universal aspects. We may say, indeed (without by any means endorsing all the individual results arrived at), that, in our appre-

hension, this well-studied and deeply philosophic volume presents on the whole one of the most vigorous attempts which has yet been made in our country to place mental philosophy upon a broad and positive basis. In doing this, every branch of metaphysical inquiry has been touched upon, and more or less elucidated; and perhaps we could not more appropriately draw our remarks on modern English psychology to a close, than by giving a very brief abstract of this, the latest work which it has produced, and one, too, which takes into account, more or less, all the results which have as yet been realized on the subject.

The first part of the work takes up the question of *certitude;* that is, it investigates the starting-point of all human knowledge, and the assurance we have of its validity. It is chiefly occupied in expounding and maintaining the "*universal postulate*" upon which a clear system of natural realism may be built; and by the simple application of which both idealism and scepticism may receive their most obvious and unanswerable refutation. This postulate is—"*That every belief which is proved by the inconceivableness of its negation to invariably exist, is necessarily true.*"

The next part takes up the *theory of reasoning.* All reasoning, in its fundamental analysis, is shown to be *a classification of relations;* while every single act of reasoning is defined as "the indirect establishment of a definite relation between two things." This theory is followed up consecutively through every species of inference, whether quantitative or qualitative; and gives us at once a test of the Aristotelian syllogism, and an exposition of all possible methods of argumentation, whether deductive, inductive, hypothetical, or analogical.

But all reasoning is based upon terms, and those terms upon mental perceptions. What, then, is perception itself? Evidently an immediate, direct, intuitive cognition of relations between things. For when I say I perceive a thing, what else do I mean, but that I separate it mentally from the whole mass of my experience, and observe its qualities as similar to, or different from, the qualities of other things by which I am surrounded? Thus all perception, all classification, all naming, all recognition, is simply the intuitive apprehension of given relations; is the very same operation, therefore, in its direct form, which reasoning is in its more explicit and indirect.

By following out this view, the author proceeds to discover the genesis of all our fundamental ideas. All mental experience begins by the observation of some change in the phenomena of consciousness. The simplest imaginable change is the *sequence* of two similar events; and the consciousness we have of their likeness or unlikeness will be the first and most fundamental act of the human intelligence. It is by the repetition of this same process, and the combinations to which it leads, that (according to the views here propounded) all our subsequent knowledge is built up; just as the whole body is constructed by the repetition of the one primary original act of cell-formation. For these fundamental relations once established, the author shows how we form consecutively the ideas of resistance, of motion, of time, and of space, the one flowing necessarily out of the other; and how we may thus ascend by the pathway of experience to all that is involved in the perception of *body* and its various attributes. The attributes of matter the author classifies

similarly to Sir W. Hamilton, into the primary, the secondo-primary, and the secondary; only, to make his meaning more clear, he terms them the statical, the statico-dynamical, and the dynamical—attributes, that is, which vary according as the object perceived is more or less active in the production of the mental phenomenon. In the whole of this development, the experience-hypothesis respecting the formation of our fundamental ideas, is consistently and logically carried out; and though it must be confessed that some points are as yet obscure, and some appear, at any rate at the first view, far fetched; yet, as a whole, we must pronounce the entire analysis one of the most acute and logically complete which has yet been presented by English psychologists respecting the genesis of our primary ideas.

The author next proceeds to the subject of psychology, properly so called; and following the path which modern science has opened, takes it up on the physiological side of the question. The first thing requisite, he considers, is to gain some proximate idea of *life;* for all organized existence, from its lowest to its highest forms, is but the varied manifestation of life in the progressive exercise of its appropriate functions. In every step of its manifestation, the author contends, the same general principles and arrangements so distinctly prevail as to justify the broad generalization which includes mind and nature as one vast whole, pervaded by the same ideas, and progressing by the same great laws of universal being.

Life may be defined as *the continuous adjustment of internal and external relations.* Such adjustment is simple enough in the lower ranks of creation; but increases in complexity in proportion as life itself rises higher up the scale of being; while in man it requires all the powers of his mental nature to compass it. *Intelligence,* accordingly, in its fundamental analysis, is the power of adjusting life to the circumstances by which it is surrounded.

The universal law of intelligence flows directly from the co-operation of mind and nature in the genesis of our ideas. It is this—that just in proportion as there is a persistency in the order or relationship of events in nature, so will there be a persistency in the connexion that subsists between the corresponding states of consciousness. The succession or co-existence of external phenomena produces, of course, a like succession or co-existence in our mental perceptions; and when any two psychical states often occur together, there is at length established an internal tendency for those states always to recur in the same order. Starting, therefore, from this law, the author first traces the growth of the human intelligence through the lower phenomena of reflex action and instinct; then, shows how our unconscious life merges into a succession of conscious phenomena; and lastly, carries us upwards, through the regions of memory, &c., to the highest exercise of reason and the normal development of the feelings.

The brief space to which this article is confined, forbids our giving any idea of the method of analysis by which these conclusions are reached. The result of the whole, however, is this—that, in Mr. Spencer's estimation, the experience-hypothesis, taken in its broadest sense, is sufficient to account for all our mental phenomena; that every form of intelligence is regularly evolved out of the harmonious connexion of mind and nature,

and that as many facts occur which no possible ingenuity can ever account for, on the principle of individual experience;—we must here have recourse to the development of races, or to that of the human race in its totality, for the explanation. On this principle we shall find at length, he thinks, a complete reconciliation of the rival claims of idealism on the one side, and sensationalism on the other.

In all these results we cannot but see how the old landmarks of mental philosophy are breaking down and disappearing under the steady advance of physiological science; and yet how imperfectly we can complete, with our present knowledge, that vast psychological structure, the foundations of which we see already laid out in the scheme of the sciences. In going through Mr. Spencer's analysis of life and its developments, we cannot help feeling throughout that the present imperfection of physiology as a positive science still throws a shadow upon some of his most important conclusions; or leaves them, to say the least, in the position of mere speculations, which the future may confirm or destroy.

The views he hints at respecting the genesis of the nervous system, and the complicated nature of the human brain, as representing an infinity of experiences gained during the evolution of life from its lower to its higher forms, can only be regarded as theories at present totally unestablished, and which have to await the future light of physiological science ere any solid conclusion can possibly be built upon them.

Moreover, acute, often convincing, as are the author's views on the intellect, so far as it is concerned in the development of primary ideas and the genesis of science, there is still a large region of mental phenomena on which he has as yet indeed thrown very little light. We mean the intuitions of beauty, the development of moral life, and the aspirations of the religious nature. It is true he only proposes to give us the "principles of psychology," and therefore it might be unreasonable in us to look for the results; but, in our apprehension, those principles are not yet deeply grounded enough to compass the whole length and breadth of the psychological problem; nor do they, indeed, lead anywhere *near* to a satisfactory analysis of the *will*.

When all the direct correspondences of the soul and the world shall have been explored, we shall not then be at the complete termination of our research; for our inquiries lead us insensibly onwards to the primary cause as well as the final goal of human reason, and to the problem of human destiny, in connexion with that great all-pervading Intelligence by which the pre-established order of the conscious and unconscious universe has been itself arranged from the beginning. If intelligence grows and expands through the perpetual adjustment of mind with nature, then must it not reach up at last to that primæval Intelligence by which the law of life has been planned and sent forth upon its mission? And if we can identify instinct as the early twilight of reason, cannot we follow out the same law of progress, so as to identify human reason itself in its present form as the twilight only of a still higher form of existence? These are questions to which psychology at present only distantly and indistinctly points us; but strange indeed would it be if the more complete comprehension of mental phenomena should be found ultimately destructive to the best aspirations and the most purifying faith of our spiritual nature. For

ourselves, we believe that while it sweeps away many narrow and noxious superstitions, it will leave the great pillars of our moral conviction and our human hopes more firmly than ever rooted in the analogies of reason, and the obvious tendencies of human life.

In conclusion, we shall sum up in a few observations the general results which appear to follow from the foregoing criticisms upon the present position and prospects of psychological science. We have found in the course of our remarks—

1. That the purely rational and abstract systems of mental philosophy uniformly prove unfruitful; very much in the same way as did the science of nature, so long as it was pursued by inward reflection only, without any systematic reference to actual and observable phenomena.

2. That the more empirical systems have contented themselves too much with a mere enunciation of phenomena, giving us rather a natural history of mental facts than any searching analysis, or broad generalizations concerning them.

3. That the researches of physiology, reaching up as they now do to the organic functions of the nervous system, both without and within the region of humanity, have set mental philosophy once again in movement, and drawn it more and more into the circle of natural science.

4. That as physiology itself is only in its infancy in regard to the functions of the brain and nervous system, it can supply at present only very partially the facts that are necessary for a complete psychology.

5. That as physiology advances, the co-ordination of the science of mind with that of nature must become more and more apparent, and the laws operating through the one must throw new light upon the fundamental processes of the other.

6. Lastly, we have good reason for the belief, that psychology, as a science, is now once again on the road of advancement; and that, grounded on positive principles, it will this time become fruitful in all its applications. Instead of leaving us in doubt and difficulty respecting the basis of human knowledge, it will exhibit with new distinctness the origin, the growth, and the validity of our ideas; will teach us to separate the material of truth from its Protean forms; will elucidate the nature and worth of the sentiments and emotions; show us the real power and energy of the human will; guide our interpretation of the religious aspirations; instruct us in the principles and laws of education; define more clearly the limits of moral responsibility; and give us, in fine, that insight into humanity as a whole, which shall promote and regulate all the operations at once of justice and of charity.

J D. Morell.

REVIEW V.

1. *A Manual of the Practice of Medicine.* By GEORGE HILARO BARLOW, M.A. and M.D. Cantab., Fellow of the Royal College of Physicians, Physician to Guy's Hospital, &c.—*London.* pp. 706.

2. *Elements of Medicine: a Compendious View of Pathology and Therapeutics; or, the History and Treatment of Diseases.* By SAMUEL HENRY DICKSON, M.D., LL.D., Professor of the Institutes and Practice of Physic in the Medical College of the State of South Carolina.—*Philadelphia.* pp. 752.

DR. BARLOW'S work is the most recent of a series of excellent manuals the rapid and extensive sale of which must afford satisfactory proof, both to publisher and authors, that their labours are very generally appreciated by the purchasers and readers of medical books. The treatise before us, on the important subject of Practical Medicine, bears internal evidence of having proceeded from the pen of an experienced, laborious, and conscientious physician; and we do not hesitate to express our conviction that "students and junior practitioners," for whose use it is chiefly intended, may safely adopt it as their guide.

We purpose now to give a general sketch of the contents of Dr. Barlow's manual, and while passing in review the chief subjects of which it treats, we shall not fail to direct attention to such errors and omissions as we believe to exist. Nor do we doubt, that in proportion as we succeed in the faithful discharge of this duty, we shall receive the thanks, not only of our readers in general, but of the author himself in particular.

The first seven chapters are devoted chiefly to the subject of general pathology:—1. Causes of Disease; 2. Modes of Death; 3. Elementary Changes; 4. Inflammation; 5. Signs of Inflammation, and of Disease in General; 6. Fatal Termination and Treatment of Inflammation; 7. Typhous, Scrofulous, and Tuberculous Deposits. A sufficiently full though condensed account is given of each of the above subjects. We would direct attention particularly to the fifth chapter—on the Signs of Disease—as affording conclusive testimony to the careful and accurate observation of the author, and containing much that is instructive to the student. From this chapter we extract the following remarks on irregular and intermittent pulse:

"The conditions requisite for the regularity of the pulse have been explained to be—a uniform current of blood to the left ventricle, and a due supply of nervous influence. Intermittent pulse does not, therefore, as has sometimes been stated, necessarily indicate valvular disease of the heart, but some circumstance tending to interfere with either of the above conditions. Amongst those which impede the due supply of blood to the left ventricle, may be reckoned—disease of the right side of the heart and pulmonary artery—disease of the lungs and their appendages, impeding the pulmonic circulation—and disease of the left auriculo-ventricular orifice. Irregular or intermittent pulse also occurs when the muscular walls of the heart are degenerated or attenuated, though probably as the result of the pulmonic congestion always attendant upon such a condition. When the pulse becomes irregular from any of these causes, it is almost always at the same time very feeble or indistinct. Circumstances may, however, arise, which may

prevent the pulse becoming irregular, notwithstanding the presence of some of the conditions just described. Intermittent pulse may also be the effect of disease of certain portions of the nervous system, or (through the medium of the nerves) of the digestive organs." (p. 76.)

The special diseases which are first treated of are rheumatism and gout. With respect to the nature of these diseases, Dr. Barlow says of rheumatism, that "its internal or essential cause seems to be an abnormal condition of the blood, which contains always an excess of fibrin and of uric acid—the latter is probably the *materies morbi*, or peccant matter." There can be little doubt that this statement with regard to uric acid is an error, for Dr. Garrod* has demonstrated, that whereas the blood of a gouty patient contains an excess of uric acid, there is no evidence of an excess of that material in rheumatic blood. With respect to gout, the author not only maintains that the *materies morbi* is nearly allied to uric acid, if it be not identical with it, but he suggests as probable that in consequence of an affinity between the uric acid and the parts affected with gout, "there may be a local excess of this substance without any such excess, or even with a deficiency in the system at large—just as there may be local hyperæmia, although the general state of the system is anæmic;" and he adds, that this explanation "receives confirmation from the recent observation of Dr. Garrod, that uric acid is present in the serum effused when a blister has been applied over a joint affected with gouty inflammation." Now, in the first place, we must correct this account of the observation attributed to Dr. Garrod, who expressly states, that while the serum of a blister on the skin will give evidence of the presence of uric acid, when the blood from the same patient exhibits the phenomena, "the application of the blister should *not* be made to an inflamed part, for it seems that the existence of inflammation has the power of *preventing the appearance of uric acid in the effused serum*."† The excess of uric acid in the blood of gouty patients is a demonstrated fact, but it is not therefore to be assumed that uric acid is the specific material cause of gout.

The consideration of the diseases of the lungs and heart is preceded by a general account of the methods of physical diagnosis; and we accord much praise to Dr. Barlow for the simplicity of his nomenclature, and the clearness of his descriptions of auscultatory signs, both in this chapter and in those devoted to the different diseases within the chest.

In the treatment of croup, we observe that the author places more reliance on tartar emetic than on calomel, giving the latter only in moderate doses as an auxiliary; and we entirely agree with him in this preference.

There are few amongst the less serious maladies to which the human body is liable which occasion a greater amount of collective misery than a common cold; and he would deserve well of catarrhal humanity who should devise some means by which *tutè, citò, et jucundè*, this disease might be cut short. Dr. Barlow says—

"The safest and best plan, perhaps, when we are consulted early, is to advise a foot-bath, and going early to bed; a few grains of compound extract of colocynth, with a sixth of a grain of tartar emetic, and three of extract of hyoscy., with

* Med.-Chir. Trans., vols. xxxi. and xxxvii. † Ibid., vol. xxxvii. p. 58.

a moderate saline aperient in the morning; and a mild diaphoretic draught, as three drachms of liq. amm. acet., with about half a drachm of spirit. æther. nit., and ten or twelve minims of vin. ant. pot. tart., or vin. ipecac., in camphor mixture, three or four times daily." (p. 196.)

Allusion is also made to the dry plan of cure, and to the more grateful moist cure. About four glasses of sherry, with sugar, in a large quantity of warm water; light reading on the sofa for the evening; a foot-bath, and early to bed. We would substitute for the sherry a grain or a grain and a half of opium at bed-time, in the case of those patients who can take that drug without inconvenience. According to our experience, however, by far the pleasantest and the most efficient means of cutting short a cold at the very commencement, is the hot-air bath.

Passing on to the subject of bronchitis, we find that no mention is made of pulmonary collapse in connexion with the morbid anatomy of that disease. We observe, too, with some surprise, that the important subject of emphysema of the lung is only referred to incidentally on three or four occasions; and that no account is given of the morbid anatomy and pathology of that very common and distressing malady. The readers of this journal will remember that Dr. Gairdner* has attempted to show that collapse of the lung from obstruction of the bronchial tubes, and emphysema of the lung, stand to each other in the relation of cause and effect; that the dilatation and rupture of air-cells, which constitute emphysema of the lung, are simply the result of a mechanical necessity for occupying space left vacant by the collapse of portions of lung whose air tubes have been obstructed by the viscid secretions in bronchitis. In the words of Dr. Gairdner,† "Emphysema is, according to this theory, an *increase in volume* of those portions of the lung to which the air has access, to supply the place of *diminished volume* in those parts from which it is excluded."

It is very probable that in this way portions of lung surrounding collapsed lobules may become emphysematous; but that this is the whole account of the pathology of emphysema, we are by no means prepared to admit. It is obvious that the great enlargement of the whole lung, and of the entire chest, which is so characteristic a feature of emphysema, cannot be explained by Dr. Gairdner's theory. And, moreover, we have repeatedly met with patients presenting all the physical signs of emphysema in a marked degree—the barrel-shaped chest, with very limited motion of the ribs, great resonance on percussion, and feeble respiratory murmur—who have assured us either that they have never suffered from cough or other signs of bronchitis, or that they have only very recently been troubled with these ailments. We therefore feel persuaded that, in some cases at least, emphysema of the lungs *precedes* the bronchitis with which it is so commonly associated; and that a true and comprehensive pathology of emphysema must take account of this fact, and explain it.

Returning to our author, we find that the subject next treated of is pneumonia. A complete and satisfactory history is given of this important disease and its treatment. We think, however, that we should, in most cases of pneumonia, abstract less blood and give less mercury than the author appears to recommend. This disease is one of those which, in

* British and Foreign Medico-Chirurgical Review, April, 1853. † Op. cit., p. 472.

a large proportion of cases, tends to a spontaneous recovery; and it is unquestionably one of the many which have too often been treated with a mischievous degree of activity.

Pleurisy is the disease which comes next under consideration. Its symptoms and diagnosis are fully described; but it appears to us that it would have been well to make special mention of *chronic* pleurisy, beginning insidiously without the sharp and pungent pain of the acute disease, attended often with little or no fever or cough, and therefore not uncommonly *latent* until perhaps it has filled one pleura with liquid. Every practitioner should be aware of the insidious progress of this form of pleurisy, so readily detected by its physical signs when once attention is directed to the chest.

With regard to the operation of tapping the chest, Dr. Barlow gives the following judicious advice:

"If, after the means which have been recommended for bringing about the absorption of fluid in the pleura have been perseveringly used, there is no apparent diminution in its quantity, or if it should suddenly increase, so as to threaten to destroy the patient by suffocation, the important question arises, whether it should be got rid of by making an opening into the pleura—that is to say, by tapping the chest. Although this operation is neither difficult nor, generally speaking, immediately dangerous, it may be well here to protest against its indiscriminate or too early employment, not only on account of the danger of admitting air into the pleura, which would, according to the principles already laid down, convert a serous effusion into a puriform fluid; but also because experience has taught us that, independently of such an accident, its repetition would produce the same result; and we have already seen that, in the majority of cases, such an effusion may be got rid of by other means. As long, then, as we believe the fluid to be serum, the operation ought not to be had recourse to, except to avert impending suffocation." (pp. 267-8.)

The subject of phthisis, which comes next in order, receives very full consideration. The directions for the prevention and the treatment of this disease afford a good illustration of Dr. Barlow's careful attention to minutiæ in the management of his patients.

Passing on to diseases of the heart, we find that the author applies the term carditis to the combination of pericarditis with endocarditis (p. 324); objecting to the restriction of that term to inflammation of the muscular substance of the heart, that this disease, "though it may be theoretically possible, is one of which we have no experience in its simple form." (p. 329.) It is probable that inflammation of the substance of the heart is in most cases, if not in every case, associated with inflammation of its lining or investing membrane; but surely it is better to apply the term "carditis" to cases in which the muscular structure of the heart is obviously the seat of inflammation, whether this be or be not complicated with disease of other textures, than to use this term, "for the sake of brevity," to designate the co-existence of pericarditis with endocarditis without an appreciable degree of inflammation of the muscular walls of the heart?

Carditis, in the strict sense of the term, though not a common disease, is by no means one of the rarest. Two cases of much interest have been recorded by Drs. Burrows and Kirkes;* and a third case, which had been previously published by Mr. Stanley,† is referred to in the same

* Medical Times and Gazette, p. 624. Dec. 1858.
† Medico-Chirurgical Transactions, vol. vii. p. 323.

communication. In each of these three cases there were several points of striking resemblance. They all occurred in the male sex, and in boys approaching puberty, from twelve to thirteen years of age. All the cases commenced with, or were accompanied by, severe pains (supposed to be rheumatic) in the muscles of the thighs and arms, but without swelling of any of the joints. In two of the cases there was a papular or pustular rash, as if the blood was contaminated; perhaps a similar eruption may have existed in the third case, though not described. In all these cases the pericardium was extensively inflamed, in addition to the carditis, but in none was there any affection of the endocardium or valves. In all the cases there was delirium, and in one convulsions, with pain referred to the forehead, so that the brain was supposed to be the seat of disease; but in both Dr. Burrows' cases a friction sound and increased duluess sufficed for the diagnosis of pericarditis. The disease was fatal in every case—in one on the fourth, and in two on the eighth day. In all the cases the muscular substance of the heart was soft, congested, friable, and infiltrated with pus. Lastly, with reference to treatment, in both Dr. Burrows' cases the delirium appeared to be increased by the abstraction of blood. Dr. Burrows attributes the cerebral symptoms to sympathy between the brain and heart, and it is probable that this explanation expresses a part of the truth; but it is at least conceivable that the same morbid condition of blood which excited the carditis and the cutaneous rash, may have disturbed the functions of the brain by a direct poisonous influence upon that organ.

With reference to Fatty Degeneration of the heart, it is probable, as Dr. Barlow suggests, and as Dr. Quain had previously stated, that in some instances this change has supervened upon true hypertrophy of the muscular substance. Now it has sometimes been suggested that mere overaction of the organ may first occasion hypertrophy, and subsequently atrophy and fatty degeneration. It is probable, however, that the imperfect nutrition of the heart in the later stages of these cases, is due to the gradual deterioration of the blood which results from the morbid conditions which first occasioned the hypertrophy. For instance, two of the most frequent causes of hypertrophy of the left ventricle are—1st. Disease of the aortic valves; and 2nd. Chronic Bright's disease of the kidney. These morbid conditions may exist separately or in combination, and it is needless here to describe in detail the processes by which each of these diseases tends to produce a gradual impoverishment and contamination of the blood; such a condition of blood, in short, as must be ill adapted to nourish a muscle which requires a continual supply of new material to supply the waste occasioned by its incessant action.

With respect to the influence of the blood upon the nutrition of the muscular structure of the heart, we would suggest as at least probable, that the softened and fatty condition of heart which is so commonly found in fatal cases of *delirium tremens*, is due to the excess of alcoholic hydro-carbon and the deficiency of protein compounds in the diet of these patients.

Dr. Barlow makes no mention of the *arcus senilis* in connexion with the diagnosis of fatty degeneration of the heart, and it is probable that he agrees with us in thinking that since Mr. Canton first taught us that

the *arcus senilis* is a fatty degeneration of the margin of the cornea, it has been too hastily assumed that this appearance of the eye so frequently co-exists with fatty degeneration of the heart, that the change in the cornea affords presumptive evidence that the more formidable cardiac disease is making progress within. There is no analogy of structure between the extra-vascular cornea and the highly vascular muscular tissue of the heart which renders it *à priori* probable that they would be specially liable to a simultaneous degeneration. There is, in respect of structure, a closer analogy between the cornea and the hair; and our own experience leads us to suspect that an extended series of careful observations would show that the *arcus senilis* is much more frequently associated with grey hair and baldness than with degeneration of the heart. It cannot be denied that grey hair, partial baldness, and the *arcus senilis* may co-exist for many years in the persons of men in robust health, who have never manifested a symptom of internal disease, and who may at length attain to extreme old age. We could point to several living illustrations of this truth; and we protest against the hasty assumption of a doctrine which would be a fearful addition to the sources of hypochondriasis, and which would persuade thousands of men just past the meridian of life, and destined to live to a good old age, that death is visibly written in the opaque margin of their cornea. On the other hand, since the absence of the *arcus senilis* affords no kind of presumption that the muscular structure of the heart is free from degenerative changes, it is manifest that the appearances in the cornea afford little aid in the diagnosis of cardiac disease.

With regard to the prognosis of valvular disease of the heart, Dr. Barlow states that it is much less unfavourable in disease of the aortic valves, whether obstructive or regurgitant, than in cases of mitral disease. There can be no question that, as a general rule, cases of merely obstructive disease in the aortic orifice, indicated by a systolic murmur at the base of the heart, are those in which the prognosis as to the probable duration of life may be most favourable; but our own experience would lead us to the conclusion that regurgitant disease of the aortic valves, indicated by a diastolic murmur at the base, is at least as unfavourable a form of disease as mitral regurgitation, with a systolic blowing at the apex. We agree with Dr. Barlow, that when disease of the mitral valve is obstructive as well as regurgitant, it is more rapidly fatal than any other form of valvular disease, the contractile power of the auricle being insufficient to overcome the impediment offered by narrowing of the mitral orifice.

After valvular disease, its consequences, and its treatment, aortitis and aneurism come under consideration; the signs of thoracic aneurism being well described, and the indications for treatment briefly explained. Then follows a chapter on Diseases of the Liver and its Appendages, in which Dr. Budd's well-known work is frequently quoted. Next in order come Diseases of the Œsophagus and Stomach, and we are here tempted to quote the author's description of two remarkable cases of perforating ulcer of the stomach.

"In one instance, of an elderly man who had been long suffering from apparently intractable dyspepsia, with great pain and distension immediately after taking food, several perforating ulcers were found in the stomach after death; but

most of these opened into the portions of the intestine, between which and the stomach adhesion had been established before the perforation occurred. Thus one communicated in this way with the duodenum, and two with the transverse colon; whilst one opened freely into a large sac or pouch formed by thick fibrinous lymph effused upon the surfaces of the adjacent viscera.

"In another case, which occurred some years ago in Guy's Hospital, there were the pain and tenderness of circumscribed peritonitis in the left hypochondrium, in an elderly female, who had before been in the hospital for what appeared to be chronic gastritis; but what was remarkable, symptoms of pleuritis speedily followed, and shortly after those of considerable pleuritic effusion, combined with which there were metallic tinkling and amphoric cough and voice, so distinctly marked as to lead those who were unacquainted with the previous history of the case to believe that pneumo-thorax existed. Inspection after death showed a large perforating ulcer of the stomach at the (small?) curvature, through which the contents passed freely into a large pouch of false membrane, spread out upon the neighbouring viscera, the roof of which was formed by the diaphragm, through which the inflammation had extended by contiguity to the left pleura, giving rise to serous effusion in that cavity; the pouch before mentioned being distended by flatus from the stomach, produced the amphoric sounds by the concussion caused by the movements of the diaphragm in breathing, coughing, or speaking; affording a curious instance of the auscultatory phenomena which may be produced in the abdomen."* (pp. 422-3.)

Passing over a chapter on Dyspepsia, we come to one on Peritonitis, which contains a very complete account of the causes, signs, and treatment of that formidable disease. Dr. Barlow expresses his belief that disease or irritation of the ovaries is a cause of severe peritonitis more commonly than is generally known, or at least recognised by medical authors. He mentions one case occurring in the person of a young married lady, who imprudently sat upon the grass at a pic-nic party about the time that the catamenia might be expected to appear. A few days afterwards she was seized with rigors, followed by the symptoms of severe peritonitis, which ended fatally. Upon inspection after death, there was found extensive peritonitis, which appeared to have commenced from the serous coat of the left ovary, the ovary itself being large, hyperæmic, and containing a cyst about the size of a pea. Another instance, which was not fatal, commenced at the catamenial period, the catamenia being delayed. We agree with Dr. Barlow in opinion, that if it be true, as cases of this kind appear to render probable, that peritonitis may result from ovarian irritation, "the fact is important, not only in a pathological, but also in a practical and prophylactic point of view."

With reference to the puerperal form of peritonitis, Dr. Barlow with much reason insists upon the necessity for caution on the part of accoucheurs in coming in contact with persons suffering from infectious diseases—particularly erysipelas and scarlatina—lest by means of their clothes or hands they become the vehicles of poison to their parturient patients. Every practitioner of midwifery, too, ought to be wary of making post-mortem examinations. A late friend of ours, engaged in large midwifery practice, received a coroner's order to examine the corpse of a fever patient, which he unhappily did with his own hands. He then went home, had a shower-bath, and changed all his clothes. In the

* Amongst several errors of the press which have escaped the author's correction, we observe that in the page (423) from which the above extract is taken, the word jejunum is in two places misprinted *jenum*.

course of the day he attended two women in labour, both of whom were soon seized with puerperal fever, and both died. The husband of one of these women caught erysipelas, which resulted in suppuration within the elbow joint; and her daughter got erysipelas, and died. The influence of cadaverous matter in producing puerperal fever, and the efficacy of chlorine as a disinfectant, are remarkably shown in the experience of the Lying-in Hospital at Vienna.* In this hospital there are two divisions; in one the patients being attended by midwives, and in the other by physicians and their pupils; and it was found that the mortality from puerperal fever was always greater—even four times greater—in the latter division than in the former. Dr. Semmelweis at length recognised the fact that both he and the students frequently made post-mortem examinations; that the cadaverous smell on their hands, in spite of repeated washings, did not disappear until after a considerable time, and that the pupils not unfrequently proceeded to the examination of women in labour immediately after dissecting a dead body. This was the only one of the probable causes of puerperal fever which either did not occur at all, or occurred only in a very limited degree, in the midwives' division. Dr. Semmelweis now acted upon this information. He recommended all students frequenting the division not to handle dead matter, or if they did, he forbade them to make any examination till the following day. And he directed all the students to wash their hands in a *solution of chlorine, prior to and after every examination.* The result of these precautionary measures was that *the number of deaths at once fell to the usual average of those in the midwives' division.* We trust that few practitioners of midwifery are ignorant of these facts, or unaware of their immense practical importance.

Dr. Barlow has given much attention to the subject of obstruction of the bowels, and particularly to the diagnosis of the seat of obstruction. We are indebted to him for having been the first to direct attention to the assistance which may sometimes be derived from observing the amount of urine secreted in these cases. He says:

"The condition of the urine is most important as regards the diagnosis of the seat of the obstruction. When the obstruction is high up, as in the duodenum, the quantity of urine is so small, or rather the suppression so complete, that cases of this kind have been mistaken, and that, too, by men of experience, for ischuria renalis; whereas, when the stoppage has been very low down, as in the sigmoid flexure, for instance, the urine is abundant and clear. In the first case the suppression of the urine may in a great measure be accounted for by the sickness; it may be observed, however, that sickness, as ordinarily observed, independent of mechanical secretion near the stomach, never suppresses the secretion so completely. In the case of obstruction in the descending colon, as there is no sickness, and as there is delay in the passage of its contents along the intestinal tube, there is abundant opportunity for absorption; and therefore, from the large quantity of fluid taken up by the veins, the quantity which passes out becomes large." (p. 450.)

Another circumstance which deserves investigation when we would ascertain the character or seat of the obstruction, is the degree of contraction of the lower bowel when carefully explored by a bougie, or the œsophagus tube.

* See Dr. Routh's interesting and instructive paper: Medico-Chirurgical Transactions, vol. xxxii.; also, Liebig's Familiar Letters on Chemistry, third edition, p. 530.

"When sudden obstruction takes place in any part of the alimentary canal, it generally happens that the whole of the bowel below this part speedily and even forcibly empties itself; and this perhaps applies more particularly to the small intestines, where obstructions, when they do occur, are generally from twisting, intussusception, or acute inflammation. This produces a forcible contraction of the rectum, such as in one instance to have induced a doubt of the diagnosis of obstruction high up in the small intestines, from the fact that it was almost impossible to introduce the tube, or even the finger, into the rectum, so forcibly did the bowel contract through its whole course below the closure. And the same thing occurs from sudden occlusion, or sudden stoppage from inflammatory affection in the large intestines. . . . . When, however, the stoppage takes place from chronic thickening or contraction, or from malignant disease, occurrences which are more likely to take place in the large intestines, the bowel often loses its contractility below as well as above the seat of obstruction; and therefore the rectum, upon examination by the finger, will often be found dilated; so that upon the introduction of the œsophagus tube it will often coil upon itself in the pouched bowel, which may lead to a belief that it has passed a considerable distance up the canal." (p. 450.)

Passing over a chapter on Muco-enteritis, Tabes mesenterica, Diarrhœa, and Dysentery, we come to one on Diseases of the Kidneys, which, considering the great importance of the subject, we are compelled to pronounce less complete and satisfactory than any other part of the book. Under the general term Nephritis, Dr. Barlow includes all the forms of inflammation of the kidney, without attempting to distinguish them from each other; and although he admits that "the diagnosis of nephritis is not without its difficulties," he makes no allusion to the microscopical appearances in the urine in connexion with this form of disease.

The subject of Bright's disease then comes under consideration. Of this disease the author says:

"If all the fatal cases of heart disease and disease of the brain originating from albuminuria or Bright's disease, be taken fairly into the account, it will be found that this disease is second only to phthisis in the number of lives which it destroys." (p. 478.)

Dr. Barlow then adverts to the minute structural changes in the kidney in the following remarkable sentence:

"Into the minute changes which constitute the varieties of Bright's kidney it is not our province very minutely to enter, not because those changes are in themselves devoid of interest in a practical point of view, but because their description, belonging more to pathological anatomy, would refer the reader to the 'Pathological Anatomy' of Drs. Jones and Sieveking." (p. 478.)

Now the power of distinguishing the different forms and stages of Bright's disease by means of a chemical and microscopical examination of the urine, is so intimately dependent on a correct appreciation of the minute structural changes which the kidneys themselves undergo, that it is impossible to separate these subjects in any account of renal disease which is to be available for the practical purposes of diagnosis and prognosis. It is therefore not surprising that Dr. Barlow, being content to refer his readers for a description of the pathological anatomy of the kidney to another source, without himself making use of the excellent materials which are there ready to his hand, should have failed to write in a satisfactory manner on the different forms of Bright's disease, and the means of distinguishing them.

Without attempting to point out all that is incorrect and defective in the account which Dr. Barlow has given of the pathology and diagnosis of Bright's disease, we may refer to the following sentence, as an illustration of his mode of treating this subject. Speaking of the contracted form of Bright's kidneys, he says:

"There is no deposit in the tubes, but the degeneration consists of a large increase of fibrous tissue, which, by its subsequent contraction, strangulates and atrophies the secreting cells, much as in the case of advanced cirrhosis of the liver." (p. 481.)

Now, not to insist upon the doubt which we entertain as to this being the true account of cirrhosis of the liver, it is entirely inaccurate so far as it relates to the kidney. There *is* a deposit in the tubes in this particular form of disease; as may easily be shown, not only by a microscopical examination of the kidneys after death, but by the almost constant appearance of tube-casts in the urine during life. The primary change in the kidney affected with this form of disease is a desquamation and crumbling of the gland-cells which line the tubes. The disintegrated cells appear in the urine in the form of "granular tube-casts." The tubes being thus deprived of their epithelial lining, waste, and at length many disappear; meanwhile the meshes of the matrix which contain the atrophied tubes become narrowed, and their fibres appear relatively thicker; hence the notion that "a large increase of fibrous tissue" is the essence of the disease. These changes, and others of much interest affecting the bloodvessels of the kidney, which our limits do not permit us now to describe, are all easy of demonstration, and therefore cannot safely be made the subject of vague surmise or random assertion by any author who has a regard for his reputation.* We are happy in being able to state that, with respect to all that relates to the treatment of Bright's disease and its complications, Dr. Barlow has given plain and sensible directions.

In the chapter on Urinary Deposits, which follows that on Renal Diseases, we have marked for the author's correction in his next edition the following passage relating to the means of distinguishing between urine which is alkaline from ammonia, and that which is rendered so by a fixed alkali.

"Ammoniacal urine does not at first affect blue test paper, but when the paper has dried it becomes red. This is not the case with urine alkaline from fixed alkali." (p. 514.)

This is a somewhat perplexing statement, but it is probable that the author intended to write to this effect: Reddened litmus paper has its blue colour restored by immersion in ammoniacal urine; but when the paper is again dried, especially by artificial heat, the ammonia escapes, and the red colour returns; whereas red litmus is rendered permanently blue by a fixed alkali, even though the paper be warmed and dried.

The diseases of the nervous system are next treated of; three chapters of considerable length being devoted to the following important diseases: Inflammatory Disease of the Encephalon; Delirium Tremens; Mania; Apoplexy; Paralysis; and Spasmodic Affections. Under this last head are

* We may refer those of our readers who are interested in the question of the forms and subdivisions of Bright's disease, to two articles in previous numbers of this journal, the first, Jan. 1853, p. 56; the second, Jan. 1855, p. 122.

included not only Chorea and Epilepsy, but also Asthma and Colic. With regard to the treatment of those cases of delirium tremens which are the result of mental excitement and anxiety, the author insists upon the necessity for great caution in the use of opium, and intimates that calomel and henbane will be the best internal remedies in such cases. We admit the necessity for caution in prescribing opium for any form of nervous disease, but we doubt whether its use is more hazardous or less beneficial in cases of delirium resulting from mental excitement and anxiety, than in the delirium of drunkards. We have seen the happiest results from opium in the former class of cases, and have not witnessed any ill effects from its cautious use, beyond the temporary nausea and inconvenience which an opiate occasions in a certain proportion of patients, of what kind soever may be the disease for which that drug is prescribed. We believe, however, that the use of opium requires extreme caution in cases of delirium—whether the result of intemperance, or of over-work, or anxiety —which are accompanied by great prostration of strength, with a feeble, fluttering pulse, and a tendency to syncope. In such cases, the heart being perhaps ill-nourished, soft, and flabby, we believe that opium may have an injurious influence—not as a narcotic, but as a sedative acting upon the feeble heart. The wakefulness and delirium continue unabated, the pupils contract, a cold sweat bathes the skin, and the patient rapidly passes into a state of hopeless collapse. In treating a patient threatened with such a group of symptoms, we should withhold opium, and give alcoholic stimulants, with a liberal allowance of beef-tea or other nourishment.

Dr. Barlow gives a very full and complete account of the causes and pathology of apoplexy and paralysis. The following extract is a fair specimen of his mode of treating this important subject:

"If we endeavour to analyse the causes of apoplexy, we find the immediate ones to consist of extravasation of blood into the substance of the brain, upon its surface or into the ventricles; pressure upon, or compression of, the substance of the brain, by determination of blood, or an undue quantity sent to that organ; disease of the arteries, generally of a large branch, intercepting or diminishing the supply of arterial blood to a large portion of one hemisphere, often producing, or attended by softening of some portion of the nervous substance, from impaired nutrition; poisoning of the blood circulating in the brain, by retained secretion, as in the case of uræmia; and as a doubtful cause, we may add, simple loss of power by the brain, or a portion of it, constituting the true simple apoplexy of Abercrombie; but we regard this cause as doubtful, since it is difficult to find unexceptionable instances from which all the other causes have been eliminated." (p. 551.)

To this catalogue of the causes of apoplexy may be added, a diminished supply of blood, and consequent softening of the brain through the *accidental* obstruction of an artery: as, for instance, in the remarkable case of dissecting aneurism of the aorta, innominata, and right carotid, recorded by Dr. Todd;* and the cases related by Dr. Kirkes,† in which softening of a portion of brain resulted from obstruction of a branch of the middle cerebral artery, apparently by fibrinous coagula which had been detached from the valves of the heart, and thence carried onwards with the circulating current.

With regard to the causes of cerebral hæmorrhage, the author proceeds to say:

* Medico-Chirurgical Transactions, vol. xxvii. p. 301. † Ibid., vol. xxxv. p. 281.

"If we still further pursue the train of causation, we find that, as the extravasation must have proceeded from ruptured vessels, this rupture may have arisen in one of two ways—either the vessels may have been subjected to an unusual amount of distension, or, in other words, the blood may have been too forcibly injected into them, or the vessels themselves may have been diseased." (p. 552.)

Again, the causes of over-distension of the vessels are various. 1. The injecting force of the left ventricle may be excessive, in consequence of hypertrophy of its muscular walls. The author believes that too much importance is attached to this as a direct cause of sanguineous apoplexy. He argues, that the hypertrophy being a conservative change, is only sufficient to overcome the impediment to the flow of blood, which is occasioned perhaps by disease of the aortic valves, or of the large arteries. He admits, however, that in cases of regurgitant disease of the aortic valves, the jerking motion of the blood, which is indicated by the peculiar "water-hammer" or "splashing pulse," may occasion an unusual strain upon some of the remote vessels, and that laceration may result from this.

We would direct attention to another class of cases in which it is probable that one element in the causation of cerebral hæmorrhage is over-distension of the minute vessels by an hypertrophied left ventricle. We allude to cases of chronic renal disease, in which, as is now well known, hypertrophy of the left ventricle is often found to exist unassociated with disease of the valves or large arteries. The explanation of the hypertrophy in these cases is to be found in the interesting fact, that when the blood contains an excess of excrementitious materials, such as urea, carbonic acid, &c., it is impeded in its passage through the minute vessels. The heart therefore being impelled to increased efforts, in order to overcome the resistance thus occasioned, undergoes a corresponding degree of hypertrophy. Now, although the increased power of the left ventricle may only just suffice for the extra labour imposed upon it, and although the blood may pass through the capillaries of the brain with only the usual force and speed, yet it is obvious that there must be unusual pressure and strain upon those portions of the vascular system which lie between the hypertrophied left ventricle and the seat of the above-mentioned impediment—probably the minutest arteries or the capillaries; and that this increased strain upon the vessels will be attended with a risk of rupture and extravasation. The liability to cerebral hæmorrhage in cases of chronic renal disease with hypertrophy of the left ventricle, is still further increased by the frequent occurrence of degeneration of the walls of the minute bloodvessels—a result, probably, of the impoverishment and contamination of the blood, engendered by the renal disease. It follows, from a consideration of the important facts to which we have thus briefly adverted, that no pathological history of a case of apoplexy or paralysis can be complete without a careful examination of the urine, with a view to ascertain the presence or absence of renal disease.

After speaking of increased injecting force in the left ventricle, Dr. Barlow thus describes another mode in which the vessels of the brain may suffer from over-distension:

"On the other hand, we may have a delay in the return of the blood through the veins, arising from obstruction in the pulmonic circulation, whether produced by disease of the mitral valve, or the lungs, or air-passages, especially the latter,

as in the case of chronic bronchitis; but in such cases the obstructed circulation through the veins, though it must in time be propagated to the arteries, and does in some instances give rise to laceration and extravasation, yet when it is the cause of apoplexy, it is so more commonly by means of pressure from engorgement of the vessels of the brain." (p. 552.)

We would add to these observations the remark, that one element concerned in the production of apoplectic symptoms in the cases referred to, is the narcotic influence of carbonic acid, when an accumulation of that gas occurs as a consequence of defective aëration of the blood—the result of pulmonary disease. The author gives minute directions as to the treatment of apoplexy; and the following sentence—with the purport of which we entirely concur—may be looked upon as the text of his remarks upon this subject:

"There has been no more prevalent or dangerous error, nor one which has more slowly yielded to the increased accuracy of modern pathology, than, that all cases of apoplexy are to be met with active depletion and other powerful antiphlogistic measures; whereas, from what we have seen, the apoplectic disease may arise from such very different causes, and be connected with such very different conditions of the system, that it is obvious that the same remedies cannot be applicable to all." (p. 558.)

The remaining chapters of Dr. Barlow's book are on Intermittent and Continued Fevers; Eruptive Fevers, with which is included Erysipelas; Epidemic Cholera; Influenza, and Hooping-Cough; and, lastly, under the head of Diseases of Adolescence and Puberty, a brief account is given of Delayed Development, Amenorrhœa, and Hysteria.

With regard to the question of the identity or non-identity of typhus and typhoid fever, a question the interest of which has been greatly enhanced by the laborious and accurate observations of Dr. Jenner, the author expresses his opinion in the following terms:

"The conclusions which it appears we may most legitimately draw from our present information upon the subject is (*sic*), that in the fevers in which the mulberry-coloured and livid spots are present, there is a greater tendency than in others to assume the low sinking form, and perhaps a greater liability to head affections; but that nevertheless there may, and frequently does, occur severe bowel irritation, with inflammation and ulceration of the lower portion of the ileum. When there is the rose rash, on the other hand, there is almost always great bowel irritation, and not such early depression from the effects of the poison; but the frequency with which one form of the disease has been found to occur side by side with the other in many epidemics, though it may not have done so in all, and the almost imperceptible differences by which they appear to be distinguished, in some instances, seems at present to preclude the belief that they are specifically different." (p. 626.)

The author's account of the pathology and treatment of epidemic cholera may be summed up in the brief statement, that all the symptoms of collapse are due to the drain of water from the blood; and that the primary object of treatment is to check the diarrhœa. We trust that before Dr. Barlow is called upon to prepare a second edition of his work, he may have the time and inclination to study some of the published facts and arguments, which tend to show that his account of the pathology of this disease is inaccurate, and the treatment which he recommends not so certainly beneficial as he appears to suppose.

And now, having endeavoured to give a true and faithful report of Dr. Barlow's labours, and having already expressed our opinion of the general merits of his book, we purpose to notice some of the topics treated of in the second work whose title appears at the head of this article.

Dr. Dickson, the author of this work, having been, as he states, a teacher of medicine for thirty years, and a student more than forty, and having published several text-books and other volumes upon medical subjects, intends the present volume as an aid to young men who have engaged in the study of medicine, to physicians who have recently assumed the responsibilities of practice, and to his fellow-professors of the institutes of medicine, who have felt the difficulty of communicating to the first two classes the knowledge which they are earnestly seeking to acquire. It was necessary, he says, that the book should be compendious, yet that it should contain everything essential for a fair development of the subject, and that it should be written in a simple and easily intelligible style.

Of the two parts into which the work is divided, the first is devoted to the subject of "General Pathology," and the second to "Special Pathology and Therapeutics." Under the head of the incidental causes of disease, the author makes the following allusion to some special sources of dyspepsia amongst his countrymen:

"In this country it may be affirmed that we have the worst possible cookery, and hence indigestion or dyspepsia prevails almost as a national infliction. But our custom of hasty eating, and our almost universal habit of chewing tobacco, tend also to the same result. Mastication, the instinct to perform which seems to be lost, in the children of civilized parents at least, should be taught to every child when its teeth begin to present themselves." (p. 35.)

In a subsequent page, the injurious effects of tobacco are again referred to.

"Smoking and snuffing are common both in the New and in the Old World; but it is only in the United States that chewing is a habit of civilized life, extending itself even among refined gentlemen. The mischief done is not perhaps as obvious or direct as might be anticipated; but there cannot be a question that much of the impairment of digestive power and of animal vigour secretly felt, and of the integrity of the nervous system, so often complained of, must be ascribed to these unfortunate national customs." (p. 47.)

Dr. Dickson, remarking that man is the only animal who drinks while eating, suggests the question whether this habit is not hurtful, by diluting the fluids of the stomach, and especially whether the drinking of very cold liquids is not likely to be injurious; and he observes, with much reason, as we think, that those who drink iced water or champagne immediately after hot soup, run a risk the consequences of which they probably will not always evade.

The following remarks on the subtle nature of animal poisons, we submit for the consideration of those gentlemen who, with praiseworthy diligence, have endeavoured, by the aid of chemistry and the microscope, to detect the cholera poison in the air, or in water, or in morbid excretions.

"In every contagious morbid poison, some new and peculiar result has followed the combination of the elements which go to constitute it, which the highest

magnifying powers of our microscopes have not hitherto shown us, nor our nicest chemical analyses prevailed to detect, any more than they have apprehended or made manifest the odorous particles of musk or rose. If this be true of the fixed and palpable contagions [as, for instance, the variolous poison], what shall we say of the tenacity of those which are denoted as impalpable, which offer to us nothing tangible, but confound us by their invisible potency, and avoid all our means of circumscription and limitation?" (p. 56.)

In a section on the *seats of diseases*, the author makes a passing allusion to the former vehemence of discord between humoralism and solidism; then observing that the actual commencement of morbid change, whether in the solids or fluids, can rarely be made palpably manifest, but that we may be led to a very satisfactory inference concerning this matter by certain familiar considerations, he thus happily illustrates the subject:

"From the great storehouse of the circulating mass of the blood must be built up all the solid tissues of the body—must be formed all the secreted fluids—must be separated all the excretions, properly so called. But the blood itself must, in its turn, depend for the integrity of its composition upon the action of the tissues, whose condition is of necessity a modifying element. The ultimate source of their functional power, their special capacity, we trace to the influence upon them of the great nervous centres. Every part of every tissue depends immediately upon its nerve, and the blood sent to it for its life; and these, the nerves and blood, are mutually dependent upon each other. . . . . . But both the blood and the solid tissues are liable to impressions from without, which materially modify their condition. The former may be directly poisoned by the entrance into, and admixture with it, of many injurious agents, some of which may be detected and exhibited. It is often indirectly poisoned by the influence of contingencies which prevent the elimination of such effete matters as must be got rid of to keep it in a normal condition. We have reason to infer the existence in it of injurious ingredients, whose presence we cannot demonstrate, by the ultimate results. The blood may thus become, so to speak, passively diseased. The solids may be acted on mechanically or chemically, and disintegrated or broken down. But a diseased condition in any solid tissue implies activity, a reaction, as it is called, which may vary indefinitely with the varying nature of the agent that causes it. The capacity for such reaction depends absolutely upon its nervous and vascular connexion and supply continuing uninterrupted; and hence we are led, I think inevitably, to the conclusion that the blood and the nervous tissue are the primary seats of disease." (p. 110.)

The *tendency of disease* forms the subject of one section, the author expressing his conviction that the tendency of all forms of disease is essentially to death—death, either of a part or of the whole of the body, according as the morbid affection has been general or local. The announcement of this opinion, he says, will surprise those who have received the ancient and plausible doctrine of a *vis medicatrix naturæ*, which he denies. But it is evident that this is a mere dispute about words, for he admits that an organ has the power of recovering its normal condition when the cause which disordered it has ceased to act. As the disease to which we give a name has no existence apart from the body, so neither has the *vis medicatrix* a separate existence. A supposed morbid poison induces that condition of the body to which we apply the term scarlatina; and that a body thus morbidly affected has an active tendency to revert to the condition of health, as a cut finger has to re-unite and to heal, can scarcely be denied by any one whose mind has not been perplexed by a theory which obscures his view of the facts.

Dr. Dickson concludes the first part of his treatise by expressing a wish that civilized and Christian nations would resume the ancient classical practice of burning the bodies of the dead. After referring to the noxious emanations from the crowded graveyards of the Old World, and expressing a fear lest similar evils may ere long exist in the burial-grounds of some of the American cities, he suggests that it would be far better to substitute the polished vase, the marble urn, for the cold and clammy clay and the noisome graveyard; and he intimates that the relics of "all that our souls held dear," might thus become the inmates and ornaments of our habitations.

Passing on to the second part of Dr. Dickson's treatise, we find a definition of *therapeutics* which every student and every practitioner would do well to remember.

"Therapeutics comprise the whole management of an attack of disease: the regimen, the physical and moral control, nursing, &c., as well as the administration of medicines. Indeed, this general and comprehensive superintendence is often of far more importance than the mere pharmaceutical appliances and means employed. Voltaire's sarcastic definition of the 'practice of physic' as 'the art of pouring drugs, of which we know little, into a body, of which we know less,' is a most unjust reproach when applied to the modern scientific physician, of whom prudence is the peculiar attribute—*nullum numen abest si sit prudentia;* and who believes, with Chomel, and acts upon the belief, that the first duty of the practitioner is to take care that he does his patient no injury in his efforts to benefit him." (p. 172.)

In the classification of diseases the author follows a physiological arrangement, describing—1st. Those which affect the Circulatory, or Vascular System; 2nd. The Digestive System; 3rd. The Respiratory System; 4th. The Sensorial System; 5th. The Motory System; 6th. The Excretory System; and 7th. The Generative System.

The large and important class of fevers which are included under the first head are described at considerable length. The subject of malaria receives full consideration, the author's long practice in a malarious district having afforded him abundant opportunities for studying this source of disease. His account of the various types of fever abounds in quotations and references to authorities, both ancient and modern; but his descriptions sometimes want the precision which would render them valuable for deciding a disputed point—as, for instance, the identity or the difference of typhus and typhoid fever.

The following passage on the use of stimulants in fever shows, as we think, the practical good sense of the author:

"I avow, for my own part, that when I see the respiration hurried and impeded by debility, the pulse flagging, the skin covered by a cold and clammy exudation, I do not entertain any very fastidious scruples as to the ulterior effects of my stimulants. I am only afraid of finding them inefficient to act upon the little remains of excitability present. The objections which have been so obstinately urged against them originated, surely, in the logical essays of the closet, not in sick rooms or in hospitals, not at the bedside of the debilitated and the dying." (pp. 240-1.)

The extracts which we have given will doubtless, as we intended they should, convey the impression that there is much in Dr. Dickson's work which is excellent. Yet we are bound to express our opinion that the book, as a whole, very imperfectly fulfils the conditions required in a text-book on the practice of medicine at the present day.

In order to justify this opinion, we need only refer to the author's account of the physical signs of disease of the lungs and heart. This is unquestionably a subject of great interest and importance, yet we find not only that it is treated with extreme brevity, but that in several instances the physical signs are so inaccurately described as to have impressed us with the conviction that the author's practical acquaintance with the subject must be very limited. For instance, the physical signs of phthisis are described in eleven lines, and a part of the description is, that "when a vomica is formed, and a cavity more or less emptied, we have *resonance* and pectoriloquy;" the author evidently supposing that resonance on percussion over a tuberculous cavity is the rule, and not, as we believe, a rare exception to the rule. Apparently, too, he has the same idea with respect to the third stage of pneumonia, for in describing the signs of this disease he says—"When purulent matter is spit up, we hear the mucous râle, or a gurgling; there is *restored resonance on percussion*, but not the respiratory murmur," &c. (p. 606.)

We extract entire the author's account of the means of distinguishing chronic bronchitis from phthisis:

"The distinction between chronic bronchitis and tuberculous phthisis is often difficult. In the latter there is less crepitus, or râle, less soreness of the trachea and thorax, more tendency generally to hæmoptysis, and less expectoration in the early stages. In their advanced progress, we can draw no line between them, except from their previous history." (p. 601.)

The whole description of the physical signs of acute bronchitis is contained in the following sentence:

"Resonance upon percussion is dull, and the respiratory murmur is impaired very generally over the thorax." (p. 599.)

Nothing, surely, can be more unsatisfactory than this mode of dealing with an important subject which admits of being treated with scientific accuracy.

The author believes that the frequency of Disease of the Heart has been exaggerated; he is aware that it is customary among pathological writers to treat of cardiac diseases as of very common occurrence, but, he says,

"I am persuaded that, except the symptomatic and transient disturbances with which the profession has always been familiar, they are comparatively rare—at least in our own country, and in its southern portion." (p. 337.)

After quoting the statements of Watson, Latham, and Bouillaud as to the frequent association of cardiac disease with rheumatism, he says:

"After nearly forty years' practice, I can truly assert that I have seen but two cases of rheumatism terminate in serious palpable disease of the heart." (p. 338.)

And he cites the opinion of Professor Wood, of Pennsylvania, who says that he knows of only one case of incurable heart disease which has resulted from inflammatory rheumatism, under his own care, in persons above the age of puberty. Dr. Dickson suggests, that one cause of the comparative rarity of this complication of rheumatic fever in America may be "the larger and freer use of opium." We confess, however, that we entertain much doubt as to the author's practical skill in auscultation, and therefore as to his power to detect the disease which he believes to be so rare. In describing the normal sounds of the heart, he says that one cause of

the *first* sound is "the *opening* of the mitral and tricuspid valves." This may possibly be a misprint, but it is not in the list of *errata*. The following is the entire description of the physical signs of pericarditis:

"The physical signs are—dulness, at first from turgescence; the friction sound, as of two rough surfaces rubbing together, owing either to dryness or to shreds of membrane on the inner face of the sac; then perhaps creaking, or the *cri de cuir;* effusion of serum soon dulls all noises, and does away the friction sound." (p. 341.)

Our doubts as to the alleged rarity of heart disease in America are strengthened by a perusal of the author's account of dropsy, of which he says:

"In the bills of mortality published in our country, it will always be found to occupy a conspicuous place, presenting annually an average number of victims inferior to that of few other maladies. In frequency of occurrence and in difficulty of cure it is alike remarkable." (p. 389.)

We turn then with some interest to the chapter on Diseases of the Kidney, and there we find it stated of Bright's disease—the whole account of which occupies less than a page—that "it is happily not often met with among us in the south." (p. 739.) It would appear, therefore, from this statement, that the frequency of dropsy cannot be due to the common occurrence of renal disease. Indeed, the author appears to doubt whether there is any special relation between renal disease and dropsy; for he says, with reference to the coagulability of the urine in connexion with dropsy: "For my own part, I have not been able to draw from it any clear or positive inferences, either as to the nature of the attack, its causes, or its remedies." (p. 389.) Our next resort, then, in searching for the cause of the frequent occurrence of dropsy, is to the Liver, and especially to *cirrhosis* of that organ. Of this disease, again, the author says: "It is not, I think, often seen in our country" (p. 559); and his brief and inaccurate description of its morbid anatomy suggests the conclusion that he has had few opportunities for studying the disease.

It appears, therefore, that dropsy is a very common disease in a country where diseases of the heart and kidney, and that particular disease of the liver which is most commonly associated with dropsy, are reported to be rare. Yet the author, in the course of his long history of the various forms of dropsy, mentions no causes of that disease which can be considered peculiar to America, except it be a habit of dirt-eating amongst the blacks, which, he says, is connected with a species of cachexy on which anasarca is an almost constant attendant. After a careful perusal of Dr. Dickson's account of the causes and pathology of dropsy, we have arrived at the conclusion that it represents much more nearly the knowledge of these subjects which was possessed by the profession thirty years ago, than the knowledge of the present day. It is much to be regretted that this antiquated and inaccurate pathology should have found a place in a text-book intended for the use of students and young practitioners; for assuredly modern pathology is more simple and intelligible, and a better guide for those who are learning that difficult art which has for its object the prevention and cure of disease.

George Johnson.

REVIEW VI.

Chirurgische Klinik. Beobachtungen und Erläuterungen in dem Gebiete der Chirurgie. Von Dr. HERMANN FRIEDBERG, Docenten der Chirurgie und Staatsarzneikunde an der Friedrich Wilhelm's Universität in Berlin. Erster Band, mit 23 Tafeln Abbildungen.—*Jena*, 1855. pp. 320.

Clinical Surgery. Observations and Explanations in the domain of Surgery. By Dr. HERMANN FRIEDBERG. Vol. 1, with 23 Plates.

THE volume before us is the first of a promised series, which the author designs for a repertory of surgical cases and observations. It is pretty exactly of the nature of our 'Hospital Reports,' and is made up of very elaborate records of groups of surgical cases, with such practical observations as happen to be suggested by them. It possesses, however, one advantage over the 'Reports' of our own country,—namely, that of being somewhat profusely illustrated with plates. There are in all 12 cases, and their various circumstances are exhibited in as many as twenty-six drawings. It is plain that the limner's art has yet more assistance to render to the medical naturalist; by increased rapidity and cheapness in the execution of convenient drawings, it may illustrate far more extensively than heretofore, or perhaps supplant, his lengthy verbal descriptions of many objects, and thus materially advance both the domain of science and, as Dr. Friedberg's book shows, the comfort of its cultivators.

Of 5 cases of *Reparative Surgery*, 3 rhinoplastic, and the others blepharoplastic, we select the following:

CASE I. Maria W., aged thirty-two, presented herself in the following condition ten years after having been infected with syphilis.

"The entire nose was destroyed, and an oval opening in the middle of the face existed in its stead. The surrounding soft parts were tumid, and seamed with scars, and they had been drawn into the opening during the healing of the foregoing ulcers. So considerable was this traction, that the upper lip was much shortened, and raised at its middle into an acute angle, and the inner extremities of the eyelids were drawn inwards. The septum was gone, and portions of dead bone were visible in the exposed nostrils as far back as the body of the sphenoid. Small ulcers, still unhealed, remained in various parts of the nasal cavity. The patient had no sense of smell, and never sneezed. Tickling the walls of the cavity with a feather, and the contact of the vapour of strong ammonia, produced no effect. She had epiphora, and was deaf.

"As soon as the ulcerations had healed, Dr. Friedberg transplanted a large flap from the forehead, and constructed a new nose in the usual method. The septum, however, was made of unusual length, in order to secure the replacement of the upper lip, after the complete division of its adhesions with the lower edge of the nasal opening. The flap adhered everywhere, and became a tolerably comely nose; some sense of smell returned, and when the vapour of the caustic ammonia was inhaled, the pupil and eyelids contracted, and the tears flowed. The epiphora also ceased, and the deafness diminished. About five months after the operation the patient ejected a dead piece of the sphenoid bone through the mouth, and had a fresh attack of periostitis in the sternum. Her general health, however, was much improved." (p. 3.)

The issue of this case may serve to show that the rule which precludes reparative operations during the continuance of the constitutional affection, is not absolute. But although important local advantages were no doubt obtained by the reconstruction of the nose, and by the protection thus afforded to the thinly-clad bones within, yet it was at the risk of failure in an operation which would at a later period have been less uncertain of success.

The case further illustrates a point of much importance in tracing the history of cases of syphilis. The genital organs presented no indication of the previous existence of a syphilitic ulcer. Should it then be inferred, that no primary syphilis or a mere blennorrhœa had preceded such extensive and severe tertiary disease? Let such instances as the following reply:—A woman had an indurated chancre on the anterior lip of the os uteri; fourteen days after it had healed, its place was occupied by a smooth, slightly red, unseamed scar, with raised edges. In another month, every trace of it was gone. Four or six weeks sufficed to obliterate superficial ulcers of the tonsils and soft palate, whilst those which healed slowly, or which penetrate the sub-mucous tissue, left permanent marks behind them. The scar indeed remains in all cases, but is perceptible only under certain circumstances. Thus a man, aged thirty-eight, had gonorrhœa, a chancre within the prepuce, a second on the left side of the glans, and a third within the urethra. The sore on the glans was well in three weeks, but the others had not all healed until six months after their first appearance. Eighteen months afterward he became again infected, and had phymosis, with considerable swelling. During the swelling, the scar of the original ulcer of the prepuce was distinctly visible, and of a pale, dull-white appearance. The man then died of delirium tremens, and after death the scar on the glans was imperceptible.

Another point of interest in the case is, the restoration of the functions of the olfactory nerves and nasal fibres of the fifth, soon after the closure of the unnatural orifice of the nose. The observation is one not commonly made, and the explanation is consequently uncertain; but it seems most probable that the loss of sensation in those parts of the Schneiderian membrane which had not been ulcerated, arose from their extreme dryness in the large current of air to which they had been exposed. So delicate is the layer of tesselated epithelium which clothes the nasal cavity, that it is apt to be useless even upon slighter occasions than that of the loss of the nose. A faulty mucous secretion, or a cessation of that which naturally keeps the epithelium free and moist, renders the latter incapable of retaining and transmitting to the extremities of the nerves the odorous materials which come into contact with it. Moreover, the current of air is undoubtedly no longer directed towards the upper and olfactory part of the nostrils when the inlet is much misplaced.

The author furnishes a few observations on the subject of the fall of the hair in cases of syphilis. Sometimes the hair is loosened at its root, in consequence of an inflammatory eruption of the scalp, which is attended with the detachment of a quantity of scurf, and with an exudation into the hair sacs; but at other times it falls without any previous affection of the skin, and the immediate cause of its fall is still unknown. The author

denies that it is ever due to the use of mercury, since in that case goldbeaters should be particularly affected in this manner; and Rayer observed an abundant growth of hair in a goldbeater who was suffering from mercurial tremor, brought on in the course of his occupation. Dr. Friedberg adheres rather to the opinion, that the hair falls in consequence of being badly nourished by the blood of syphilitic patients; and he supports that opinion by the quotation of instances in which he discovered venous murmurs associated with syphilis and loss of hair, in persons who in other respects appeared to be in good health. We may state, however, that we have failed to discover a murmur under such circumstances.

The mode of operating in two of the reported cases of reparative surgery is worthy of description. It was suggested by Burow, and appears to have succeeded in the following instances.

"CASE II.—A girl had her nose and portions of both cheeks destroyed by lupus exedens. The nose was restored in the usual manner from the forehead, and the gap in the left cheek filled by sliding forward a flap with a broad base; but the part to be extirpated from the right cheek was too large to be replaced in the same manner. The diseased spot was accordingly removed by three incisions, of which the inner, forming the base of the triangle, was inclined downward and a little backward, and was prolonged into the upper part of the neck. On the lowest part of this long incision, beneath the jaw, and on the side opposite to the triangular wound in the cheek, a second triangle was marked and excised; its form and size were the same as those of the upper triangle, but its position was reversed; and its base or outer side was cut on the prolonged line, equal to the base or inner side of the triangle in the cheek. After the excision of the triangles, two flaps were left, which were separated by the long incision, and formed by it and the nearest side of each triangle respectively. These flaps were then loosened from the subjacent structures, and were shifted, the outer upward, over the gap in the cheek, and the inner downward over that in the neck. The whole wound, when united by sutures, resembled the letter Z. With the exception of some ectropium of the lower lid, the case did well." (p. 37.)

The success of this operation appears to have depended on the mobility of the flaps, and on the careful measurement of the parts which were to be applied to each other. The bases of the two triangles being of equal length, the vertical edges of the flaps were necessarily equal; and the remaining sides of the two triangles being respectively equal, the edges of the two horizontal wounds were also well adapted to each other. The following case is an interesting modification of the same principle of operating.

"A child of four years of age having necrosis of a piece of the frontal bone, half-an-inch broad at the superciliary ridge, and extending for an inch up the forehead, had the whole piece removed by operation. In consequence of the disease and the operation together, the tarsal cartilage was completely everted, and its free edge bent up and adherent to the bone; the eyelashes and eyebrow were mingled, and the whole intervening depth of the eyelid was destroyed. The conjunctiva being exposed, was red and tumid, but was not large enough to cover the eye, and some strabismus and opacity of the cornea were the result. By a triangular incision the whole scar was excised, and the lid freed from its connexion with the bone; the base of the triangle was parallel with the free edge of the lid, and its sides passed on either side of the cicatrix, and met above it. To bring the sides of this triangle into apposition being impossible, its base was prolonged by incisions reaching outward to the temporal region, and inward to the

nose. A triangular piece of skin was then excised at each end of the prolonged line, but on its inferior side; and the base of each triangle was formed, on the prolonged incision, of *half* the length of the base of the triangle, which was to be closed in the upper lid. The flaps on either side of the latter triangle were then extensively raised from the subjacent parts, and were brought together, whilst the sides of the two inferior triangles were likewise united by suture. After the union of all the parts together, their general appearance somewhat resembled a pair of scales." (p. 125.)

This case also did well.

The chapter on *imperforate anus* possesses considerable interest and importance. The numerous modifications of cases of this nature are systematically arranged, and some useful practical observations are associated with the descriptions.

Besides the ordinary defects of this region, in which either the anus is not formed, or the rectum imperforate to a varying extent above a natural anus, the author has collected a series of cases which illustrate their numerous combinations with other faults in the development of these parts. The defects just mentioned appear to be the natural conditions of the rectum and anus at certain stages of fœtal growth. But instead of these, or in combination with one of them, the rectum may be prolonged as a narrow dense tube, from a dilated part above to the skin behind or before the scrotum, to the urethra, the bladder, or the vagina, and may open by a small orifice at any of these points. Other more or less serious irregularities of development may be associated with these, such as hypospadias and spina bifida. In some cases a cutaneous outgrowth springs from the perineum, or from the usual site of the anus, and it might be supposed to indicate the spot at which the rectum terminates. But there is no necessary connexion between the two, and the presence of such a growth furnishes no assistance in determining the mode or the position in which to operate. A considerable narrowing of the pelvis constitutes a more definite and serious indication of the state of the parts within, for it is usually found that when the pelvic cavity is small, the rectum terminates within the abdomen. The association of a narrow outlet of the intestinal canal with hernia appears to be merely a mechanical result of the straining efforts at defæcation, and not itself a fault of development; for the same result is not unusually observed from a narrow congenital phymosis, and the rupture sometimes speedily disappears after the operation of circumcision.

In estimating the value of different modes of treatment, various circumstances are to be taken into consideration. The cases naturally divide themselves into two kinds. Those in which the anus is well formed may sometimes be relieved by passing a trocar and cannula through the imperforate part of the rectum, and life may afterwards be prolonged by careful and regular dilatations of the punctured orifice. Sometimes, however, this plan may not succeed, and at other times the circumstances of the case may forbid it. Thus, Amussat met with a case in which the vagina and rectum communicated below an imperforate portion of the latter. He was therefore compelled to construct an artificial anus behind the natural one, and to bring down the upper portion of the rectum to the margins of his incision. The girl lived and throve,

and in the summer before last, at nineteen years of age, was about to be married.

If there be no anus, the puncture with a trocar may be said to be never advisable, as being insufficient to produce a permanent cure of the defect. When the rectum cannot be found after an incision in the natural situation, it is preferable to open the colon in the manner of Littre or Amussat, rather than to plunge the trocar deeper within the pelvis. There may be, as there has been, a question in these cases, whether the rectum should be sought from below at all, or some part of the colon should not rather at once be opened. Many cases on the Continent have been treated on the latter plan; but in this country, we believe, the artificial anus is invariably made in the natural situation. In some cases, indeed, it may be questionable whether the condition of the patient be really improved by opening the colon; whether, for instance, an anus in the groin or loin be preferable to a communication of the rectum with the vagina, provided the communication be sufficiently large to allow the evacution of the contents of the bowel. But there can be no question that an anus in the natural situation would be preferable to such a condition; and provided the mucous membrane of the rectum be brought into continuity with the skin of the perineum, there would seem to be no greater tendency to subsequent contraction in the perineum than in the groin or lumbar region. In some respects the two operations are of equal value, as, for instance, in their leading to the subsequent closure of the unnatural openings by which the rectum sometimes terminates. The author formed an artificial anus in the natural situation in a boy two months old; and at his death, three months afterwards, a narrow canal, by which the bowel had formerly terminated in the perineum immediately behind the scrotum, was obliterated. Desgranges, on the other hand, opened the colon of a girl of four years of age; and he states, that in eight months, fæculent discharges ceased to pass through a previous communication between the rectum and vagina.

The author adduces one consideration of much weight in favour of thoroughly prosecuting the operation in the perineum—namely, the slight degree in which the constitutions of newly-born children resent operations. He is of opinion that surgeons sometimes give up a really feasible operation in the perineum, from an ill-grounded fear that the infant may not bear its completion; and he cites instances in which the operation was stopped, although the rectum was found after death to have been quite within reach. We will quote his own words. The general rule, as we have said, is a valuable one, and should be borne in mind; but the extent to which it seems to have been acted on, will suggest a doubt of the wisdom of the Prussian law, which renders a surgeon liable to an action at law for not operating enough—for omitting, for instance, to perform in an infant such an operation as that of Littre or Callisen.

"Before proceeding to estimate the value of the operation for constructing an artificial anus in the perineum, I must refer to the slight reaction which takes place in newly-born children after operations. There is a manifest difference in this respect between the two cases which I have described. In the child of twenty-two hours old, in which I made an artificial anus in the perineum, no reaction whatever could be perceived; neither fever occurred, nor an inflamma-

tion of the wound; and even the spot from which I removed the cutaneous outgrowth cicatrized after an extremely trifling suppuration. In the boy of two months, however, decided febrile symptoms took place, the edges of the wound inflamed, and suppuration appeared on the second day. This observation confirms the view which many other cases have led me to take, that children bear operations much better just after their birth than at a later period. The explanation of the fact is probably to be found in the low degree in which the independent life of the young creature is yet developed: and it presents an analogy with the condition of inferior animals; for in both there is but little tendency to suppuration, and there is a marked proneness to the form of healing by the first intention. . . . . Acting upon this view, I operated upon a child sixteen hours after its birth. The case was one of double harelip and cleft palate, and the condition of the parts was such that, besides paring the edges of the clefts, I was compelled to separate the soft parts from the whole of the intermaxillary bone, and not only to loosen the upper lip, and a great part of the right cheek, with the ala nasi, from the jaw, but also to make a longitudinal incision in either cheek, in order to relieve the tension. This operation is certainly so severe, that one might be induced to fear for the consequences, and yet the child was quite well after it, slept quietly, and sucked well; and on the sixth day the union was so far firm that I removed the last sutures, and substituted strips of plaster." (p. 199.)

The author's conclusion with regard to the site for the operation is:

"With the exception of those very rare cases in which the whole rectum is wanting, or its upper part, if only so much exist, adheres to the fundus of the urinary bladder, or terminates in a narrow canal, it must extremely seldom be impossible for a patient and careful operator to make the anus in the perineum; but should the operation be really not feasible, without doubt he must resort to that of opening the colon."

The whole of this chapter is valuable, and will amply repay perusal. The book terminates with some cases of tumours of bone and of the parotid region. With the exception of one of the latter, which was of colloid structure, they do not call for any remark; but that case, in the present incomplete state of our knowledge of colloid disease, we think worthy a brief notice.

"Amalie S., aged thirty, a large, well made, and married woman, of fair complexion and lively temperament, presented herself, with a tumour in the region of the parotid, of seven years' standing. She had in her childhood suffered from scrofulous enlargements and suppurations of the cervical absorbent glands, from eruptions on the scalp, and otorrhœa. At twelve years of age she had measles, and then a cough, which was attended with occasional hæmoptysis until she was eighteen years of age, and with copious expectoration, which did not cease until her twenty-second year. The catamenia appeared for the first time at that age, but the discharge was profuse, and always irregular.

"In the following year she married, and the menstruation became worse, the discharge continuing four or six weeks at a time. She was never pregnant. Soon after her marriage she accidentally discovered that a tumour had formed in the right parotid region, and had reached the size of a bean without occasioning her any pain. Four years afterwards it had become larger, and was the seat of smart shooting pains, which increased during the following three years.

"In November, 1852, the tumour was as large as the half of a small apple, hard, elastic, and unattended with pulsation, or with the enlargement of any of the cutaneous veins near it. The skin moved readily over it, but the tumour itself could not be dislodged from or moved in its bed between the jaw and the mastoid process. The surface of the growth was somewhat lobed. It was painful, but not tender.

"The whole tumour was removed by operation, and presented the following appearances. It was composed externally of a smooth, fibrous, and somewhat tough capsule, and was readily distinguishable from a portion of healthy parotid gland which had been removed with it. The general mass was disposed in rounded lobes, which were incompletely parted from one another by septa prolonged inward from the capsule. The principal portion of the interior of the tumour was arranged in granular growths, which corresponded to each of the lobes, and sprouted, cauliflower-like, into them; the remainder of their cavities was filled up by a fluid resembling synovia. Cavities of the same kind, and having similar contents, were found here and there within the substance of the growths themselves. The greater part of these growths was soft, granular, and of a whitish-red or yellowish-white colour; the lowest portion was somewhat like a strawberry, and separated from the capsule by a viscid fluid stained with blood.

"*Microscopic examination.*—Magnified 250 times, the substance which appeared to have been last formed, presented the appearance of a delicate open network of straight and waved connective fibres, intermixed with a few elastic fibres, and an abundance of capillaries. Countless, round, oval, and fusiform cells lay scattered amongst the connective fibres, and their delicate outline being but faintly illuminated, they produced a general gelatinous appearance of the surface, resembling that of a granulating ulcer. Many of the cells had biscuit-shaped and double nuclei, and were undergoing spontaneous fission, whilst others were passing into fibrous tissue. Here and there were spots in which the fibrous and cellular structures were wanting, and nothing but a viscid fluid, and a few solitary cells or flat clusters of cells, occupied the irregular spaces. It seemed as though the intercellular substance of the connective tissue had not become sufficiently firm to form a true tissue, but had occasioned the coalescence of the plastic cells, which swam freely in it.

"All stages of growth presented themselves in different parts of the tumour, from the gelatinous material just described, to the whitish, firmer, and granular tissue which constituted its chief mass. In this latter part the number of firm connective fibres was greater, and that of the recent cells was smaller, than in the softer portion of the growth; whilst the interspaces were smaller and closer. This granular soft tissue became, in some parts, an uniformly fibrous, firm mass, like fibroid, the densest fibrous cords co-existing in it with the smallest interspaces, and with few and small cells. From their general appearance it might be concluded that all the firmer parts of the tumour were the oldest, and that they were formed of substances which had once been similar to the softer portions.

"Some concentric laminated balls of colloid substance were scattered here and there in the tumour, which were peculiar from being, for the most part, cretified, and similar to the sand of the pineal gland. No trace of the parotid gland-substance was detected in the tumour.

"In respect to diagnosis, this tumour might be considered as one of cellular kind, if considered only as to its isolated, encapsuled exterior, and as to its granular lobed structure and network of connective tissue. Its small interspaces, filled with serous fluid and floating clusters of cells, showed some alliance with one of the forms of cancer, though not enough to determine its nature as cancerous. The larger spaces resembled those of cysto-sarcoma; but the construction of the tumour out of gelatinous material indicated its similarity to collonema." (p. 237.)

The patient did well, and remained so a year and a half after the operation. The state of the catamenia, however, continued as before.

Dr. Friedberg has, moreover, noted the effects of operations upon the temperature of the body, and has recorded his readings of the thermometer in the several instances of operation which he has described in the book. Beyond the fact, that during the febrile reaction succeeding an operation the thermometer indicates a rise in the temperature of the

body, the only matter of interest is, that that rise is greatest after the extirpation of cancers, and is followed by a greater subsequent diminution of the heat of the surface in these than in other cases. Such a diminution might be expected from the observation of the author, that the temperature of the body is ordinarily greater in persons affected with cancer than in those suffering from other surgical diseases.

Charles H. Moore.

Review VII.

1. *Handbuch der Speciellen Pathologie und Therapie.* Erster Band. *Allgemeine Störungen der Ernährung und des Blutes, Krankheiten des Bewegungsapparates.* Bearbeitet von R. Virchow, J. Vogel, und Stiebel.—*Erlangen,* 1854. *Das Fieber.* Von Rud. Virchow, Professor der Medicin in Würzburg.

Handbook of Special Pathology and Therapeutics. First Vol. *General Derangements of Nutrition and of the Blood; Diseases of the Organs of Locomotion.* By R. Virchow, J. Vogel, and Stiebel.—*Erlangen,* 1854. *Fever.* By R. Virchow, Professor of Medicine, Würzburg.

2. *On Pyrexia.* By E. A. Parkes, M.D., Professor of Clinical Medicine in University College, and Physician to University College Hospital. ('The Gulstonian Lectures,' 1855.)

A hot skin, a quick pulse, intense thirst, scanty and high-coloured urine—to how many diseases are these symptoms common? They constitute a large portion of all definitions of specific fevers; they are important symptoms of all local inflammations. Fever—pyrexia—are the terms used indifferently to express such a group of symptoms. In local inflammations, we are accustomed to abstract, so to say, these symptoms from others proper to the special affection, and to speak, for example, of pneumonia and of the fever that accompanies it; while those diseases which are accompanied by these same symptoms, but unaccompanied by constant local lesions of grave moment, we term emphatically, Fevers. The fever or pyrexia is common to all. It is to the consideration of the intimate nature of this abstraction that the essay of Virchow and the lectures of Parkes are devoted.

"I am about to speak," says Dr. Parkes, at the commencement of his first lecture, "of fever in a general, not in a specific sense; I am about to abstract from various diseases, those pyrexial symptoms which are common to all; which, like shadows to substance, are necessary to the very existence of typhus, small-pox, plague, or pneumonia; but yet are not, *per se,* any one of these diseases."

"*Calor præter naturam,*" was Galen's definition of this abstract fever. Later physicians thought the definition insufficient; they knew that fever commenced with rigors; they thought they knew that at such time the temperature was lower than natural; and as they were satisfied that the disease, the fever, had even then commenced, they felt that some other symptoms must be included in the definition of fever—so a quick pulse was added to *calor præter naturam.* Subsequent observers noted that increase in the rapidity of the heart's action was a no more certain test of the presence of fever than was elevation of temperature, and so they added yet other symptoms to the definition. Still the insufficiency of all the

definitions was pretty universally acknowledged, until De Haen, substituting the thermometer for the hand in estimating the temperature of the body, demonstrated that even during the rigors which precede the hot skin, there is an appreciable elevation of temperature, sometimes so much as 4° R. It now seems to be placed beyond doubt by the observations of Gierse, Roger, Von Bärensprung, Traube, Zimmermann, and others, that preternatural heat is the symptom, the presence of which is invariable in fever—the symptom which is never absent when fever is present—and that rigor is merely a peripheric phenomenon; that even when the surface feels cold to the bystander, the inner parts are abnormally warm. "While the outer parts freeze," writes Virchow, "the inner burn."

In fever, as in health, the temperature of a part is in proportion to the quantity of blood that flows through its capillaries in a given time; the greater the quantity of the blood, the higher the temperature. In the cold stage of fever, there is some impediment to the flow of blood through the capillaries of the skin: that less blood passes to the skin under these circumstances is proved by the pallor of that structure. The chief part of the nerves by which we appreciate temperature are distributed to the skin; hence, though the temperature of the blood is high, the diminished flow of that fluid to the skin more than counterbalances the elevation in its temperature, and a general sense of chilliness or of absolute cold is the result.

Whatever induces anæmia or venous hyperæmia of a part, must diminish the temperature of that part. But the sensation of cold experienced by the patient will be not merely in proportion to the anæmia or venous hyperæmia, but to these states *plus* the sensibility of the part to changes of temperature.

But yet more, the researches of Zimmermann and Bärensprung have shown that, in some cases at least, an elevation of temperature precedes the cold stage of intermittent fever, and that many fits of ague are to be detected only by an elevation of temperature appreciable alone by the thermometer; and Jochmann even supposes the rapid elevation of the temperature of the blood to be the exciting cause of the rigors. *Calor præter naturam* being, then, the one essential symptom—the pathognomonic symptom—of fever, the question arises, to what abnormal condition of the body is this elevation of temperature due?

"Admitting," says Dr. Parkes, "that normal heat arises from chemical changes controlled by the nervous system, has the excess of heat, which constitutes fever, an analogous origin? Is the chemical action similar to that of health, only in excess, or is it something altogether special? Does it arise from the presence in the body of some peculiar chemical agency, or is there some peculiar bodily condition which leads to the formation of extraordinary compounds out of ordinary tissues? And then what part do the nerves play in these actions, and how far is their affection primary or secondary, essential or subordinate and inconstant?"

The answer to the question is given by Virchow, in his definition of fever:

"FEVER CONSISTS ESSENTIALLY IN ELEVATION OF TEMPERATURE, WHICH MUST ARISE FROM AN INCREASED CONSUMPTION OF TISSUE, AND APPEARS TO HAVE ITS IMMEDIATE CAUSE IN ALTERATIONS OF THE NERVOUS SYSTEM." (p. 37.)

Or at greater length in the following summary of his views, by the same author:

"Every disease may become febrile, every disturbance may form itself into a fever, if it extend itself to the centres which regulate the waste of the tissues, and the proper moderating power of the tissue-metamorphosis is suspended. If these moderating centres are to be sought for in the nervous system, it will be a question of an abnormal tension-condition (*Sind diese Centren ein Nervensystem zu suchen so wird es sich um ein abnormes Spannungsverhältniss handeln*), which is induced by the exciting cause of the fever, and is not resolved in the natural courses (*Bahnen*). In proportion as the power of the moderating centres is restrained, the waste of the tissues is increased, and so the proper warmth of the body increased; and here the exact starting point of fever is attained. In the precursory stage we see only the weakening of the bodily and mental activity, which follows immediately from the tension-condition (*Spannungsverhältniss*)."

Taking Virchow's definition of fever as a text, Dr. Parkes has brought together a large mass of new and collected facts, for the purpose of proving the truth of each of the three heads into which Virchow's definition naturally falls. We propose to give our readers an abstract of these facts, and of their bearing on the questions at issue.

That *Calor præter naturam* is the essential and pathognomonic symptom of fever, is supported by so large a number of well known, unquestioned, and unquestionable facts, that Dr. Parkes passes it by with a very few words.

The elevation of temperature in fever "*must* arise from increased tissue consumption," says Virchow. What proof is there of this? demands Dr. Parkes, and then proceeds to answer his own question. Now it is manifest that, if we were to collect all the excretions in a given case of fever (the patient taking no more food than in health), and were to find those excretions more abundant than in health, the truth of the proposition would be rendered probable; and further, that if repeated observation showed the same to be true of all other cases of fever, and that the temperature and the amount of the excretions bore some relation to each other, the truth of the proposition would be rendered highly probable; and if yet further the loss of weight of the patient proved to be in all cases in proportion to the amount of excretions and to the temperature, the truth of the proposition would be rendered in the greatest degree probable. But there are practical difficulties in the way of collecting some of the excretions in cases of fever, which have not as yet been efficiently overcome. "Two of the excretions—the cutaneous and pulmonary—cannot be collected and measured with anything like the accuracy necessary in such an inquiry."

Dr. Parkes thinks, however, that it may be assumed that "when the respirations are not quickened, and when the skin is not evidently sweating, the excretions of these two organs are not increased."

The other two excretions can be measured with accuracy; and as the urea of the urine represents "two-thirds of the whole quantity of nitrogen" which passes out of the body, the sulphuric acid "represents almost entirely the oxidation of the sulphur," and the oxidized phosphorus of the body passes away almost together in the same fluid, we may fairly admit Dr. Parkes' conclusion—viz., that

"A careful examination of the urine and of the intestinal discharges, with an approximative estimate of the pulmonary and cutaneous excretions, give us sufficiently extensive and accurate materials for the question at issue."

The most opposite statements have been made regarding the quantity of the excretions in fever compared with the quantity in health. Dr. Parkes' own researches on this point are most interesting and important; for they have enabled him to show that the excretions are in certain cases increased, while they have enabled him to show also, that in other cases of the *same* febrile diseases they are diminished, the temperature being as high in the one set of cases as in the other. A superficial examination of these facts might lead to the conclusion that tissue-waste and temperature bear no relation to each other; a more profound examination of them leads to the opposite conclusion.

Fever, with Increase in the Amount of Solids excreted.

Six cases observed by himself, and three recorded by Alfred Vogel, are given under this head. Of these nine cases, two were rheumatic fever, one erysipelas of the head and face, four typhoid fever, one febricula, and one pyæmia. In one of Dr. Parkes' cases of rheumatic fever, the temperature being for some days 3° Fahr. over the standard, the urinary solids averaged in each twenty-four hours, 200 grains more than in a state of health; the intestinal excretions were not apparently diminished, and there was profuse sweating. Dr. Parkes' commentary on this case observes:

"In this instance, if we consider that no food was taken, and yet that the urinary ingredients derived from the daily metamorphosis of tissue was nearly one-fourth more than in the healthy state, when some twenty ounces of food were daily taken, the extraordinary disintegration going on in some tissue or other is evident."

In the other case of the same disease, the temperature was also 3° Fahr. above the standard, the excess of solids in the urine was 100 grains, the intestinal excretions sufficiently abundant, the quantity of food taken was very small, and the man was rapidly losing weight. The facts on this point observed by himself and others, justify Dr. Parkes' conclusion —viz.:

INCREASE OF TEMPERATURE *may* BE ATTENDED WITH INCREASED ELIMINATION; AND THEREFORE PRESUMABLY WITH INCREASED TISSUE CHANGE.

Fever, with a Diminution in the Amount of Solids excreted.

But increased elimination of solids is not a constant concomitant of increased temperature; and Dr. Parkes has given four cases to prove this point—viz., one of bronchitis, one of acute sthenic pneumonia, one of typhoid fever, and one of rheumatic fever. We shall quote the two last:

"In an unequivocal case of typhoid fever, in a man aged twenty-three, in which there happened to be no diarrhœa, no sweating, and no bronchitis, the urinary ingredients were for many days below the normal amount, though the elevation of temperature was considerable.

"A girl, aged nineteen, with acute rheumatism, and with a temperature averaging 102° Fahr. in the mouth, passed for several days an extraordinarily small amount of urinary solids; there was no compensation for this in other ways, for she was breathing tranquilly, the bowels were quiet, and there was only inconsiderable perspiration."

In these cases the urinary constituents which particularly "represent

the metamorphosis of albuminous tissues"—viz., the urea and the sulphuric acid, were especially decreased in amount. An objection to the conclusion which seems to follow from these cases might be made—viz., that the diminution in the amount of the solid constituents of the urine was merely the consequence of the withdrawal of food. This objection is met by Dr. Parkes, thus:

"It is evident, however, that the taking of food has nothing to do with the question at issue, which stands thus: in the healthy body the normal temperature produced by chemical change is represented in the excretions by so much urea, sulphuric acid, carbonic acid, excretine, volatile acids of the skin, &c.; in the febrile body in these cases a *higher temperature* was represented in the excretions by a *smaller quantity* of urea, sulphuric acid, and probably carbonic acid."

The conclusion from his cases is, then, irresistible—viz., that

THE PRODUCTS OF METAMORPHOSIS, AS JUDGED OF BY THE EXCRETA, *may* BE DIMINISHED IN FEBRILE CASES, IN WHICH THE HEAT OF THE BLOOD IS INTENSE.

Consumption of tissue is in health represented by certain excretory substances; the abnormally high temperature of fever is due, say the authors of the works before us, to increased consumption of tissue. But in certain cases of fever, as we have just seen, the excreta representing consumption of tissue are diminished. Does not the hypothesis, then, fall to the ground?

Virchow maintains that the diminished exhalation of carbonic acid from the lungs, which is said to occur in fever, is no proof that there is diminished consumption of oxygen during respiration; and still less, proof that the temperature of the patient suffering from fever is not the effect of chemical changes—of a process of burning. "For," he remarks, "much organic matter can be oxidized without the formation of carbonic acid;" and he leans to the opinion, that under these circumstances water is formed in the body by the direct combination of its elements, and that the oxidation of the hydrogen serves for the production of heat, while the quantity of water formed is so small—even though the heat generated be considerable—as to pass away unnoticed with any of the secretions; and he adds,

"Nay, it is also conceivable that less oxygen is taken up, and still that a larger quantity of the products of oxidation is formed, although they are less perfect; as for this to occur, it would only be necessary that a greater quantity of readily oxidizable substances should be present in the blood. Such a condition we could very well imagine, for example, in the increase of uric acid compounds, since uric acid, in relation to urea (which latter we know can be formed from it), appears to be a product of a lower degree of oxidation; and its abundant formation leads one to conclude that there is some deficiency of oxidation, which deficiency of oxidation may itself depend either on an incompleteness of the respiratory process, or on the presence of too large a quantity of matter that is capable of decomposition."

With reference to this latter point, Dr. Parkes observes that the examination of the relative amount of uric acid and urea in fever gives no more support than examinations in other disease, to the hypothesis of Liebig, that uric acid is a lower stage of oxidation than urea, because both are often increased together.

Dr. Parkes advocates most ably the hypothesis—by his facts and arguments raised to the rank of a theory—that in the cases of fever in which there is high temperature, with diminution of solid excretions, there is retention of the excretions in the blood, and not diminution in the amount formed. "We can quite readily," he says, "conceive increased metamorphosis with lessened elimination." And it seems to have been in those cases especially in which, during the earlier periods of the disease, there was elevation of temperature with diminished excretions, that at a later period copious discharges occurred from one or other of the eliminating organs.

"Thus," he remarks, "in the case of pneumonia with lessened excretion, to which I have referred, severe spontaneous diarrhœa came on. In another case of pneumonia with similar diminution in the excretions, violent purging and sweating came on. In other cases, diuresis has occurred, and an increase of urea, of sulphuric acid, and probably of uric, has been poured out."

It is conceivable, however, that even in cases in which there is increased elimination of solids, the quantity eliminated may still be much less than the tissue-waste, and that the surplus may be retained in the blood. So that increased elimination of solid excretions in any given case by no means excludes the possibility, or even the probability, of the retention of excretions in the blood in the same case.

The bearing of these facts and opinions on the explanation of "critical" discharges is evident.

"It seems," observes Dr. Parkes, "a reasonable explanation of these sudden discharges (usually termed critical, from being coincident with more or less sudden fall of temperature, and improvement in other symptoms), to suppose that a large amount of partially metamorphosed substances have been retained in the body, and at length have been brought to that point of oxidation or change which permits their elimination by one or other organ. Then by their discharge the system is suddenly freed from the noxious compounds which weighed upon it; and the metamorphosis having reached its acme, the temperature immediately falls."

Another fact given by Dr. Parkes in support of the doctrine of retention, is that secondary inflammations have been, in his experience, more common in cases with diminished elimination, than in those with increased elimination of solid excretions. In three cases he observed a sudden diminution of excretion, and simultaneously, or directly after, a local disease developed. These cases are of the highest interest. The following seems to us to tell the most conclusively of the three in favour of Dr. Parkes' position:

"In a case of protracted typhoid fever, the urine in which was regularly analysed during no less than fifty days, the average excretion of urinary solids from the twenty-ninth to the thirty-seventh days inclusive, was 422·348 grains. Diarrhœa, which had been profuse, had ceased. There had been great sweating, but this had much lessened. In spite of the late period of the disease, the temperature during these eight days averaged 153·4° Fahr. On the three last of these days (the thirty-fifth, thirty-sixth, and thirty-seventh) the urinary solids gradually diminished. On the thirty-eighth day pleurisy came on, and lasted for about five days."

While the pleurisy continued, the urinary solids averaged seventy-eight grains a-day less than during the preceding eight days. The diminution was found to be most marked in the urea, the sulphuric and the phosphoric acids.

The greater part of Dr. Parkes' second lecture is devoted to—

"A consideration of perhaps the most important general chemical condition of the febrile body; a condition which has long been partially observed, but has never been regarded as being of such interest as it really appears to be. I refer to the remarkable retention of water in the febrile system."

Scanty urine, scantiest when the skin is driest, is an almost constant concomitant of the early stages of pyrexia; and this notwithstanding the large quantity of fluid which is taken to quench the extreme thirst.

In all fevers, however, Dr. Parkes observes, there comes a time when, although the heat of the body is still preternatural, the urine passed equals in quantity, or even exceeds, the standard of health.

"In rheumatic fever the increase of urinary water is seldom seen before the joint affection has almost disappeared; in typhoid fever it occurs earlier, in mild cases about the fourteenth to the eighteenth or twentieth day, although the febrile heat is still one or two degrees over the standard."

In a case of relapsing fever examined by Dr. Parkes, the urine became abundant when the skin became moist, that is, at the period of remission.

In the early stage of pyrexia it is more common to find the skin moist, than it is to find the urine abundant.

The amount of watery matter given off from the lungs has never been determined; but judging from analogy, Dr. Parkes says, and from the rapidity with which the lips and buccal mucous membranes dry, it cannot be imagined to be so great as is exhaled from the same organs in a state of health.

The quantity of fluid poured into the alimentary canal from the several glands, and by the mucous membrane in a healthy person, is beyond question enormous. The far greater part of this fluid is re-absorbed, to be again probably poured out by the mucous membrane, and again re-absorbed. In fever the amount of this fluid is, Dr. Parkes states, greatly decreased; and this, he thinks, is proved by the dry tongue and buccal mucous membrane, by the observations of Dr. Beaumont on Alexis when in a state of febrile excitement, and by the constipation which is so common a symptom in fever. But Dr. Parkes goes farther, and suggests the probability of the movement of fluid from molecule to molecule, from cell to intercellular fluid, and from fluid to cell, throughout the whole body, being modified or interfered with in the febrile condition.

"Then at once comes the question, whether this vast circulation, to which the circulation discovered by Harvey is but the servant, is altered in fever? We can scarcely avoid concluding that it is so."

As to the cause of the retention of water in the system in pyrexia, Dr. Parkes suggests that it may possibly be due to the presence in the blood of some substance which has a powerful attraction for water.

"A fact mentioned to me (Dr. Parkes) by Mr. Graham will put my meaning in a clearer light. Mr. Graham has discovered that gelatine has an extraordinary attraction for water, so that it will even take it from alcohol, and render alcohol almost, if not quite, anhydrous. This property, manifested at all temperatures, is particularly marked at the temperature of 98° to 100° Fahr. Albumen, on the other hand, has little attraction for water, and yields it up at once to alcohol.

"Now supposing that in the rapid metamorphosis of albuminous substances in fever, gelatinous compounds, or something approaching to them, were formed—

and this is by no means unlikely—then, as a consequence of a physical law, the gelatine would at once take water from the albuminous tissues, and would necessarily give rise to intense thirst. Then, unlike sugar, the gelatinous substance would not be discharged, but must be converted into urea and uric acid, as ordinary gelatine is when it is taken as food. I mention this hypothesis merely as an example of how water might be retained in the febrile body. At present, of course, we do not know whether any such compound is or is not formed; for the transition steps, and they may be numerous, between organized albumen and urea are not known."

Another fact of interest in the chemical history of the secretions in fever, is the diminution of chloride of sodium in the urine.

To witness disease pure and uncomplicated, of a single organ, is indeed to witness a rare phenomenon. So intimately are the several parts of the organism related to each other, to the common fluid which supplies all with the elements of growth and repair, and to the agents which preside over those processes, that we can scarcely even imagine disease to be so located for more than the shortest conceivable period. Long before our senses can take cognizance of the primitive affection, other organs, other tissues, and other fluids must deviate more or less from their normal state. But if this be true, it is no less so that almost every disease is, at its outset—theoretically, at least—limited to one fluid, one structure, or one organ. The pathologist has to endeavour, with regard to each so-called distinct disease, to determine what is the part primarily affected, in what manner it is affected, and by what agencies such primary affection influences other parts, so as to give rise to the symptoms proper to or common in such diseases.

Physicians have sought to determine these points in respect of fever, of fever in its abstract and in its specific form. Now inflammation of this organ or tissue, and now of that, was regarded as the starting-point of fever—nay, was supposed to be that which, being removed, the symptoms of fever ceased; and which, so long as it continued, must be accompanied by the fever. Pathological anatomy did medicine the good service of silencing for ever the dogmatists who supported these views with so much arrogance.

In later times, even to the present, the favourite opinion has been that fever is primarily a disease of the blood; and certainly, to use Dr. Parkes' words—

"In almost all the specific diseases, in small-pox, scarlatina, measles, typhus, typhoid fever, relapsing fever, and yellow fever, a fever-making cause appears to enter the blood—*at least, it can be proved to enter in several cases;* and a strong analogical argument can be proved of its entrance into the rest."

Again: in fever which is consequent on parturition and operations, a material agent can be proved to have found its way into the blood;

"In fact," again to use Dr. Parkes' words, "this part of the argument scarcely needs discussion, as it is generally admitted that, in almost every case, if not in all, the first action of the febrile cause is on the blood."

But granting this, does it follow that those changes in the chemical constitution and the quantities of the excretions, and those altered relations of the blood and the tissues which eventuate in so great tissue consumption in place of normal nutrition—does it follow, it is asked, that these are directly due to the changes in the blood, induced immediately by the entrance into it of the fever-making cause?

Virchow answers this question in the negative; and assigns the principal part in the production of the symptoms of fever to the nervous system. His opinion is that the exciting cause of fever enters the blood, and exerts its first influence on the moderating nervous centres; and that the perceptible phenomena of fever—the symptoms—are consequent on the withdrawal of the nervous influence.

"Is it so certain that the very basis of the febrile state is to be located in the nerves, and are *all the phenomena* of fever to be comprehended in the concise though vague phrase of 'perverted elimination?'"

asks Parkes; and then gives his powerful support to the opinion of Virchow. Traube had previously remarked, that observers had directed their attention too exclusively to the origin or source of the temperature (*den Wärmequellen*), neglecting the regulators of the generation of heat (*die Regulatoren der Wärmebildung*).

With reference to the special kind of influence exerted by the nervous system on tissue consumption, *à priori* one of two things may be supposed —viz., either that the nerves are in a state of activity when much heat is being generated, and consequently much material consumption going on, or that the nerves are the moderators of tissue consumption; and that, when much heat is being generated, the nerves are in a state of inactivity, of paralysis (*der Lähmung*). The facts demonstrated by Weber, by Ludwig and Hoffa, and by Volkmann and Fowelin, concerning the functions of the vagus, support the latter view; for Weber found that section of the vagus was followed by increased rapidity in the heart's beats, and the transmission of an electric current through the cut nerve, by diminished rapidity in its action; while Volkmann and Fowelin observed that section of the same nerve was followed by an increased lateral pressure of the blood on the arteries; and Ludwig and Hoffa, that moderate irritation of the vagus was followed by a diminution of the lateral pressure of the blood on the same vessels.

The experiment of Bernard, and its converse by Waller, appear to tell yet more strongly in favour of the same view; for when Bernard divided the sympathetic in the neck, not only were the vessels of the same side of the head dilated and hyperæmic, but the temperature of the blood in the part, was higher than that of the blood in the system at large; while Waller found that contraction of the dilated vessels, diminution in the hyperæmia, and fall in temperature, followed on the transmission of an electric current through the divided sympathetic. There are no experiments or observation in support of the former view at all comparable in force with these.

The arguments advanced by Virchow and Parkes in favour of the opinion, that it is on the nervous system that the primary action of the exciting cause of fever is exerted, may be thus summed up:

Depression, apathy, a sense of exhaustion, and debility—symptoms due directly or indirectly to an affection of the nervous system—are the first evidences of febrile disturbance. Rigors and contraction of the smaller vessels also have their origin in diminished nervous influence. Increased cardiac action, pulmonary congestion, anorexia, and nausea, are most probably the result of the withdrawal of the nervous power of the vagus. The periodicity of certain fevers, the occurrence of death or recovery on so-called critical days; the abnormal state of the secretions; *the fearfully*

rapid death in many cases when no special lesion of any one organ is to be detected; and the speed with which recovery from periodical fever takes place under the use of quinine, are all due to some perversion of innervation.

Dr. Parkes thus enumerates "the various influences which seem to be active in fever, and by the combined effect of which its complex phenomena may be supposed to be produced."

"First of all, we must place the entrance into the blood of a morbific agent, and the alteration of the blood, to a certain extent, under its influence. Perhaps this occurs under the incubative period, when often there is no rise of temperature, no fever, that is, and when no appreciable alteration of the general health can be discovered. The nature of the change in the blood is unknown.

"Then, secondly, when the change in the blood has reached a certain point, the nervous system, or rather that part especially connected with nutrition and organic contractility, begins to suffer changes in composition, which probably impede or destroy the normal molecular currents. When this occurs, the nervous symptoms of weakness, depression, rigors, and contraction of some parts and vessels, speedily followed by relaxation, mark the stage of invasion.

"Thirdly, and simultaneously, various parts, especially the muscles, and probably some of the organs, deprived in greater or less degree of nervous influence, begin rapidly to disintegrate, and by their disintegration produce supernatural heat.

"Fourthly, this metamorphosis is aided, in most cases, by the condition of the vagus and vasi motor nerves which cause increased action of the heart and dilatation of the vessels.

"Fifthly, the contamination of the blood, already produced by the morbid agent, is increased by the check which the normal extra-vascular currents experience, by the pouring into the blood of the rapidly disintegrating tissues, and by the continued action of the morbid agent, which in almost all cases appears to act more rapidly and more powerfully in blood rendered impure in any way, either, as shown by Dr. Carpenter, by retention of excretions, absorption of septic substances, or, as in fever, by the too rapid metamorphosis of tissue.

"Sixthly, the various organs suffer (apart altogether from specific changes), and must, one would think, produce increased deterioration of the blood. Thus the lungs are congested in so many cases that we can scarcely suppose proper aëration to go on; the liver would seem, from Frerich's observations, to be, in some cases at any rate, in a most abnormal condition, and to produce compounds, such as leucin, unknown in health; and the spleen in many fevers, if not in all, enlarges (in persons of a certain age), and is congested, possibly even to extravasation."

Nor must it be forgotten, Dr. Parkes urges, that neutral salts are passing out of the system, while, in consequence of the withdrawal of food, few inorganic salts enter the blood.

We have now laid before our readers a tolerably full account of the important paper of Virchow, and the even more important lectures of Parkes, and from the abstract we have given it is evident that so consistent a theory of the nature of fever, one so largely supported by facts, has not hitherto been placed before the profession. While, however, we admit this, we feel that all who have to write on the subject have necessarily "to allude," to use the language of Dr. Parkes, "to inexplicable phenomena, to vast spaces still unfilled by solid facts, to spots unknown to observation, and to regions lighted only by the dim and treacherous ray of speculation;" and that much difference of opinion must consequently exist among those who write or think on so obscure a subject.

We must, then, say that, to our mind, it appears possible that too little influence has been attributed by the distinguished German pathologist whose work is before us, to the blood as the effective agent in the production of the primary molecular changes, and of the symptoms in the earlier and the more advanced stages of fever. Dr. Parkes comes much nearer, it seems to us, to the truth in this matter. For whatever evidence, speculation or facts may afford of the participation of the nervous system in the lesions of function which give rise to or constitute the appearances or symptoms of fever, equally strong evidence can be offered of the participation of the blood in the production of the earlier and the later phenomena of fever. The fact is admitted to be indisputable that the fever-making cause enters the blood; so that it is certainly *à priori* more probable that a change should be effected in that fluid before any is effected in the nervous system, than the reverse. And there can be no doubt that the necessity for a healthy condition of the blood is as essential to the formation of normal secretions as a healthy state of the nervous system. "In normal nutrition," says Mr. Paget, "the principal *factors* are the tissues and the blood in their mutual relations." In fevers which end fatally, without organic lesion of any one organ sufficient to account for death, the blood deviates in its most striking physical characters from healthy blood. We remember a case of small-pox which proved fatal on the fourth day of disease, and before the eruption appeared. In this blood, or, more properly speaking, a non-coagulable solution of hæmatosin, escaped into the cutis—giving rise to petechiæ, vibices, and bloody blebs—and into the conjunctivæ. A similar fluid oozed from the eyes, the nose, and the ears, passed from the bowels, and flowed in great abundance from the vagina. Could stronger evidence be offered that the blood was in an highly abnormal state, even from the outset, seeing that some of these symptoms appeared so early as the second day of disease? Was it necessary to go beyond the blood and its direct effects to account for the death of the patient?

Again, in typhus and other specific fevers, the microscopical characters of the blood are often such as to prove a marked deviation from its normal state; amorphous heaps of red discs replace the normal rouleaus, and the adhesion of the red discs to each other in the imperfectly-formed rouleaus is far less complete and long-continued than in healthy blood. The red discs, too, part with their colouring matter more easily, or dissolve more rapidly, than they do in the normal state, as is proved by the red serosity found in every serous cavity, and by the deep dusky red hue of every structure in contact with blood. While blood drawn during life, or found in the body after death, is loosely coagulated or absolutely fluid. And although the acid serum found by Vogel after death from pyæmia and puerperal fever may have been the direct result of changes in that fluid effected after death,* still the fact of its being susceptible to such a change shows that it had experienced some considerable deviation from its normal state anterior to the cessation of life.

* The fact of all the solids (except perhaps the adipose tissue) as well as the fluids undergoing a change after death in which an acid is developed, is not sufficiently known. This development of acid occurs in the bodies of those cut off by accident, as certainly as in the bodies of those who die from special diseases. Dr. Budd, in his excellent book On the Liver, refers to a case of his brother's, in which the liver exhibited an acid reaction, and adds, "The

But while we think there is strong evidence in favour of the primary affection of the blood, and of the wide-spread and fearfully severe influence on the system generally of the very deep lesion which in many cases we can demonstrate the blood to have experienced, independently of mere admixture of excess of excrementitious matters, we by no means exclude the nervous or any other part of the body from a share in the production of the symptoms of fever.

We cannot conclude without observing that some of the expressions used by Virchow have little or no definite meaning. For example, we have questioned a very considerable number of the most distinguished physiologists and pathologists in this country as to the exact signification to be attached to the expression *Spannungsverhältniss*, when applied to the nervous system, and one and all have replied, *Vox et præterea nihil.* Professor Virchow is most fortunate in having found so learned and practical a pathologist, and so lucid a writer, as Dr. Parkes, to place his views before the profession in this country, and to support them with such important original facts and such powerful arguments.

W. Jenner.

Review VIII.

1. *Experimental Researches applied to Physiology and Pathology.* By E. Brown-Séquard, M.D., &c.—*New York*, 1853.
2. *Sur les Résultats de la Section et de la Galvanisation du Nerf Grand Sympathique au Cou.—Paris*, 1854.

On the Results obtained by the Section and Galvanisation of the Sympathetic in the Neck.—Paris, 1854.

3. *Rapports sur quelques Expériences de M. Brown-Séquard.* Par M. Paul Broca.—*Paris*, 1855.

Report on some Experiments of M. Brown-Séquard. By M. Paul Broca.—*Paris*, 1855.

4. *Deux Mémoires sur la Physiologie de la Moëlle Épinière.* Par M. Brown-Séquard.—1855.

Two Memoirs on the Physiology of the Spinal Cord. By M. Brown-Séquard.—1855.

5. *Recherches Expérimentales sur la Transmission Croisée des impression Sensitives dans la Moëlle Épinière.—Paris*, 1855.

Experimental Researches on the Crucial Transmission of Sensory Impressions in the Spinal Cord.—Paris, 1855.

6. *Experimental and Clinical Researches on the Physiology and Pathology of the Spinal Cord.* By E. Brown-Séquard, M.D.—*Richmond*, 1855.
7. *Notice sur les Travaux de M. Brown-Séquard.—Paris*, 1855.

Notice on the Works of M. Brown-Séquard.—Paris, 1855.

Twelve years have elapsed since M. E. Brown-Séquard commenced a series of experimental researches on various animals, both warm and

acid reaction of the liver is a very remarkable fact, and probably will turn out to be very important, when the true explanation of this terrible disease (fatal jaundice) is discovered." But the truth is, that in every case, no matter what the disease of which a patient dies, the liver has a strong acid reaction if decomposition has advanced so far as it had in Dr. Budd's case.

cold-blooded. These investigations were not instituted with the view either to confirm or refute the opinions of other pathologists, nor were they undertaken to support any preconceived theory, but they were planned and executed simply to ascertain the truth on various obscure points of physiology and pathology.

Commenced in the Mauritius, they were subsequently pursued in Paris and the United States, where M. Brown-Séquard for a long time resided. The results were from time to time published in a scattered form, either in communications to the French Academy of Sciences, or in the periodicals of the day. By these works the reputation of M. Brown-Séquard was well established; but his observations had not obtained their full weight until recently, when, having delivered some lectures in Paris detailing the results of his studies, his discoveries excited so much attention, that a commission was appointed by the Société de Biologie to investigate the truth of his statements, and to confirm the results of his experiments. The report of this commission is contained in the paper by M. Paul Broca, published in 1855.

In 1851, and again in the autumn of last year, M. Brown-Séquard visited England, and on both occasions he lectured and performed several experiments at St. Bartholomew's Hospital. All who there saw him, and heard the simplicity of his explanations, could not fail to be convinced of his patience as an investigator, his skill as an operator, and his thorough soundness as a reasoner.

The plan we propose to pursue is identical with that followed in recording M. Bernard's contributions to physiology. contained in 'The British and Foreign Medico-Chirurgical Review' for 1854. It is our object to give a short *résumé* of M. Brown-Séquard's discoveries, and, abstaining from criticism, to present, in as succinct a form as possible, the most important results of his investigations. Our account of the author's discoveries will be necessarily disjointed and fragmentary, collected as it is from his numerous publications. For a general summary of his works we would refer our readers to the work entitled 'Notice sur les Travaux,' published in 1855.

In considering our author's contributions to physiology, the ordinary arrangement of physiological works has been observed; and his discoveries will be noticed in the following order—namely, as they relate (I.) to the Blood; (II.) to Animal Heat; (III.) to the Nervous System; and (IV.) to the Muscles.

I. *The Blood.*—(*a.*) The coagulability of the blood is less influenced by cold than was supposed; if, in frogs exposed to a very low temperature, half the ventricle of the heart be cut off, the blood quickly coagulates, the wound closes, and the animal may live for many months. (*b.*) Of the components of the blood some are necessary for nutrition, and some are excrementitious. The former appear, from experiments, to be the serum, the blood-corpuscles, and the oxygen; the latter are chiefly the carbonic acid, and probably the fibrin. In transfusion, all the vivifying effects of ordinary arterial blood on living animals can he produced when the blood is defibrinated. The presence of serum, blood-corpuscles, and oxygen, is absolutely necessary; no mixture of serum, albumen of egg, or any substance yet discovered, can be used as a substitute for these.

The main facts that have led M. Brown-Séquard to consider fibrin as excrementitious in the blood are the following:—1st. That, as already stated, defibrinated blood apparently possesses all the nutritive properties of natural blood; and 2ndly, that when perfectly defibrinated red blood is injected into the main artery of a limb that has been thoroughly washed out by repeated injections of diluted serum, the blood returns through the veins not only venous in its aspect, but containing small quantities of fibrin, which may be increased by exciting muscular contractions in the limb during the injection.

These results certainly strongly support that *German heresy*, as it has been called, which holds the fibrin to be a product of the retrogressive metamorphosis in the blood.* Still, it is well to be guarded, especially when it is considered how close a relation albumen bears to fibrin. In the experiments referred to, which were performed on man, though both the serum used to remove the fibrin from the vessels of the limb, and the blood previous to injection, were tested, and found to be afibrinous, yet the difficulty and uncertainty of obtaining fibrin from some peculiar states of solution in albuminous fluids is well known. It is especially evidenced in the separation of fibrin from hydrocele fluid; in which, although nothing like spontaneous coagulation will occur, yet under certain apparently mechanical conditions, coagulation ensues, and may be repeatedly produced, by fulfilling the same conditions. In the same way, the recognition of fibrin in the blood after its passage through a limb, may be due to some mechanical or other cause operating during its transit through the capillaries, which has rendered coagulable, fibrin that before escaped detection.

(*c.*) The following is a short summary of the effects that can be produced in the dead bodies of warm-blooded animals by the injection of blood. The blood used has in all cases been defibrinated, and beaten in the open air to oxygenate it; it has been injected through the main artery of the part experimented on; has been collected as it returned through the veins, and again oxygenated and injected. Thus the same blood has been used time after time: its temperature has been that of the surrounding medium.

All muscles, those of animal and those of organic life—including the iris, the muscular fibres of the skin, and bloodvessels—can be recovered from their post-mortem rigidity, and restored to irritability. To this rule the heart is, in a manner, exceptional: it can only be restored to irritability during a short period after death, and before the rigor mortis has affected it.

The muscles of animal life can be restored, by the injection of blood, to a state of irritability four and twenty hours after death, and four or five hours after the supervention of rigor mortis. They may be kept irritable in this manner for forty-one hours in one limb, although at the end of that time the opposite limb may be in a state of putrefaction. Chloroform appears to possess the property of arresting decomposition, and of prolonging post-mortem rigidity. If it be injected through the

* The arguments for and against this theory, which in England has found its main supporter in Mr. Simon, are summed up in vol. vii. p. 153, of this Review.—ED.

vessels of a limb, the muscles quickly pass into a condition closely imitating cadaveric rigidity. They are firm, rigid, and apparently contracted; and thus they remain for some days, during which, by the injection of blood, they may at any time be restored to irritability. This state usually continues till the fourth or fifth day after death; but in one case, irritability was restored ten days after the injection of chloroform.

Many of the results obtained on warm-blooded animals were confirmed by experiments on the bodies of two criminals. The blood used was in the one case human, and in the other taken from a healthy dog; it was subjected to the process before described, and its temperature was that of the surrounding medium. In the first case, half a pound of human blood was used. The man had been dead thirteen hours; rigor mortis had existed two hours. Ten minutes from the commencement of the injection into the radial artery, rigidity disappeared, and quickly gave place to irritability, the existence of which was proved by the contraction of the muscles under galvanism. This condition was sustained by continued injection, in seventeen muscles of the hand and fore-arm, for four hours and a half. In the second experiment, the man had been dead fifteen hours, and rigid for five hours: a pound of dog's blood, subjected to the usual process, was injected into the brachial artery of the left arm:

"As soon as the blood had been thrown into the artery, some reddish spots appeared in different parts of the skin of the hand, fore-arm, and wrist. These spots became larger and larger, and the skin assumed a rubeoloid appearance. Soon after, the whole surface of the skin was of a violet-red hue. In a few minutes this colour disappeared, and was replaced by the natural colour of the skin during life. The skin became soft and elastic, as in a living man, and the bulbs of the hair became erect, presenting the appearance of *cutis anserina*. By alternately increasing and diminishing the impulse given to the injected blood, the ordinary sensation of pulse in the radial artery was produced. The veins were distinct, and as full as during life. In a short time the fingers, which had hitherto been extremely rigid, relaxed, as also did the muscles of the fore-arm."

Thirty-five minutes from the commencement of the injection, irritability had returned in all the muscles of the limb. The muscles were still contractile twenty hours after the death of the man, when, from extreme fatigue, M. Brown-Séquard desisted from his endeavours to retain irritability in the limb. In this case, one pound of defibrinated dog's blood restored and maintained irritability, in all the muscles of the upper limb below the middle of the humerus, for more than five hours.

(*d.*) M. Brown-Séquard has drawn a most ingenious, and probably true, distinction between arterial and venous blood, in their respective relations to the vital properties of the tissues through which they pass. The former is, or at least contains, the nutritive material for the various tissues and organs of the body; and upon nutrition depend the various vital faculties of these tissues. Thus contractility is dependent upon muscular nutrition; the reflex faculty exists only so long as the due nutrition of the spinal cord is performed. Arterial blood maintains and preserves these faculties, but is unable itself to put them in action. It may give irritability to a muscle, but cannot itself excite a single contraction.

Venous blood, on the other hand, is not a nutrient but an excitant substance. Though unable to support the vital faculties, it can stimulate

an irritable muscle or excite a nervous centre, and produce in that a contraction, in this a reflex act.

These properties of arterial blood are generally admitted, and abundantly confirmed by experiments; and its inability to excite muscular contraction has been ascertained by M. Brown-Séquard. The excitant or stimulant effects of venous blood are best seen in death by asphyxia, from whatever cause. The spasmodic contractions of the organic and inorganic muscles occurring in death by strangulation, the various movements of the limbs taking place after death by cholera, and the expulsion of semen in sudden asphyxia,—these are thought by M. Brown-Séquard to be instances of some among the many excitant effects of venous blood. We select the following experiments as bearing on this subject:

In guinea-pigs who had arrived at nearly the full period of gestation, parturition was produced by suddenly applying a ligature to the trachea. The same experiment was performed, with a similar result, when all the lower parts of the spinal cord had been completely crushed.

In an animal just dead, one posterior extremity was injected with venous blood, while into the opposite limb arterial blood was thrown: in the latter case no movements followed, while in the former well-marked spasmodic contraction of the muscles ensued. By suddenly asphyxiating warm-blooded animals, M. Brown-Séquard produced spasmodic contractions in all the muscles of animal life, and in the respiratory muscles, the intestines, the urinary bladder, the ureters, the uterus, the vesiculæ seminales, the dartos, the iris, and the gall bladder.

The rhythmical type of contraction often assumed by muscles when poisoned with venous blood; the effects of artificial asphyxia in producing muscular contractions; and the inability of arterial blood to excite any muscular action;—these, among other considerations, have induced M. Brown-Séquard to attribute to venous blood the cause of the rhythmical movements of the heart.

II. *Animal Heat.*—(*a.*) Hunter placed the standard of the temperature of the human blood at 98·4° Fahr.; more recently, Dr. Davy* has made an extensive series of investigations, and has placed the extremes of animal temperature in man at 97·7° and 99·7° Fahr. respectively. In Dr. Davy's observations, the temperature was taken under the tongue; while Mr. Hunter observed the temperature of the rectum, which he maintained was the same as the left ventricle. M. Brown-Séquard states that in a healthy man the temperature of the rectum is between 100° and 102° Fahr.; he denies that the ventricle is the same, and fixes it from one to three degrees higher. These conclusions have been confirmed by many experiments on human urine, the temperature of which varies from 101° to 103° Fahr. Taking into consideration that the lower part of the abdomen is lower in temperature than the upper, our author fixes the standard of animal temperature for man at 103° Fahr.

(*b.*) This standard is nearly constant under ordinary conditions, and the influence exercised upon it by a change in the temperature of one extremity is very unimportant. But though the temperature of the mass of the blood is unaffected, yet if one hand be plunged into a freezing mixture, the opposite hand rapidly loses its heat. In most cases this loss

* In the Philosophical Transactions for 1845.

amounts to 6° or 8°, but in an extreme case the hand was observed to lose 22° Fahr. in seven minutes; meantime, the temperature under the tongue was very little, if at all, altered. We will here quote M. Brown-Séquard's explanation of the foregoing experiment.

"It is evident that the chilling of the hand kept in the air is a consequence either of the cooling of the blood, or of a diminution in the quantity supplied to the hand. We know that the former does not take place. The supposition then remains that the quantity of blood arriving in the hand is smaller than usual. It is certain that the heart still continues to send out the same [total] quantity of blood. Therefore, we are induced to attribute the lessening in the supply of blood to a contraction in the capillaries of the hand. "

"It is well known that under the influence of certain sensations or emotions, the hands or feet become cold. The nervous system, in consequence of that sensation or emotion, acts upon the bloodvessels, and excites them to contract; for the calibre of the cutaneous bloodvessels is sensibly diminished. The same phenomena take place in the two hands when one is dipped into very cold water. An exceedingly violent pain is felt, the nervous centres are strongly excited, and they then act as under the influence of an emotion."

(*c.*) The temperature of the blood exercises an important influence upon asphyxia. The lower the temperature of the animal at the time of experiment, the longer the duration of life under asphyxia.

Omitting the investigations on birds and reptiles, and quoting a few out of many experiments on mammalia, we find that if a ligature be applied simultaneously on the tracheæ of two adult mammals, one being at its normal temperature, and the other nine degrees below it, the former will not live for more than three minutes; the latter will survive for eight minutes. Of four adult rabbits, whose temperatures at the time of the commencement of asphyxia were 103°, 95°, 86°, and 77° Fahr. respectively, the corresponding durations of life were 6, 9½, 10, and 14 minutes. Of three guinea-pigs—one having a temperature of 104° Fahr., another 95° Fahr., the third being at 86° Fahr.—under asphyxia, the first died in two minutes and three-quarters, the second in five minutes and a half, the third in twelve minutes.

The diminution of all the functions of animal and organic life, in consequence of the loss of temperature, and bearing a direct proportion to its degree, is considered by M. Brown-Séquard to explain the diminished necessity for oxygen, and therefore the longer duration of life under asphyxia. On the same hypothesis he explains the persistence of life in cholera, scleroma, and other diseases, where the frequency of respiration is reduced to a minimum.*

(*d.*) Sir B. Brodie, and more recently Chossat, Duméril, and Demarquay, ascertained that certain poisons sensibly diminish the temperature of the blood, thereby causing death before sufficient time has elapsed for their specific action to operate on the system. Among these poisons are opium, cyanide of mercury, diluted acetic and sulphuric acids, and probably many others. Our author has confirmed these conclusions, by discovering that the effects of many of these poisons may be obviated by maintaining the animal temperature. For instance, of two animals with equal doses of the same poison, if one be placed in a temperature of 50° Fahr., and the other be maintained at 88° Fahr., the

* Connected with this subject will be found most useful tables, of the duration of life under asphyxia in different animals (pp 47–53), in Experimental Researches, by M. Brown-Séquard.

former will die with great loss of its animal heat, while the latter will completely recover. In this way the usually fatal results of coating an animal's skin with gelatine or varnish, may be avoided.

III. *The Nervous System.*—By far the larger number of M. Brown-Séquard's experiments have been made with a view to extend the knowledge of the anatomy and physiology of the nervous system. We will endeavour to give a short summary of his discoveries and his conclusions respecting this extensive subject.

(*a.*) It would appear that the influence of the nervous system upon the functions of organic life has been much over-estimated; and that the influence it exerts is not essential to their performance. Both nutrition and secretion will continue for a limited time when the nervous force has ceased to act in a part. This force takes, indeed, a certain share in nutrition, partly by its influence upon the change of arterial into venous blood—for example, in the respiration of muscles, as it has been aptly called by the younger Liebig—and partly by its regulation of the calibre of the bloodvessels: but the atrophy following loss of nervous power in a limb, which has been regarded as a chief instance of the direct effect of the abstraction of nerve-force, is in all cases simply from disuse, and may be always prevented or cured by keeping the muscles exercised by galvanic stimulus. Animals have been kept alive and in health for some months, without any spinal cord below the fifth cervical vertebra. During this time the secretion of urine, and other organic functions, the growth of hair and nails, and the general growth of the body, have continued; while muscular atrophy has been prevented by galvanism. The change from arterial into venous blood is not so complete in a paralysed limb as in a healthy one; but this also may in a great measure be remedied by exciting muscular contractions, which quickly darkens the colour of the venous blood issuing from the palsied limb.

(*b.*) In many of the vertebrata, the force exercised by the reflex function of the spinal cord far exceeds the most strenuous voluntary efforts: this is especially the case in reptiles and birds, where the development of the reflex function reaches its maximum. The following experiments prove that the reflecting power is a vital attribute of the spinal cord, and dependent upon its nutrition. A pigeon, with its spinal cord separated from the brain, can be made to raise with its feet, by fractions, a weight equal to fifty pounds, to the height of one inch. This power continues so long as the circulation of blood goes on in the spinal cord; but if the carotid artery be divided, and the animal suffered to bleed to death, it is at once lost. It may be restored again by injecting blood through the open carotid. Moreover, animals which manifest the reflex faculty of the spinal cord in the highest degree are, for the most part, though not exclusively, those in whom the supply of blood to the cord flows through lateral or transverse channels, and therefore is less liable to be influenced by transverse section of the cord, than in those where the chief supply of blood is through longitudinal arteries, which are necessarily divided in separating the cord from the brain. Consistently with this, it is found that the reflex faculty exists, in different degrees of intensity, in the several classes of vertebrata, and is least developed in fishes,* more so in mammalia and amphibia, and

* There are many individual exceptions to this order—for instance, carp, eels, and tench all possess a high degree of reflex power.

most of all in reptiles and birds. In man, the uncertainty of the manifestation of the reflex function is probably due to the same cause—viz., to the longitudinal supply of blood to his spinal cord through the anterior and posterior spinal arteries.

To trace the development of the reflex faculty in frogs and birds: We may observe that, immediately after section of the spinal cord, a period of shock supervenes, during which scarce any motor power exists. After the lapse of about five minutes, the reflex function begins to manifest itself; from this time, its power gradually increases for a period of forty-eight hours, when it has generally reached its maximum, and has exceeded the voluntary power; after remaining at this point for a few days, it decreases little by little, until, in the course of a month or six weeks, it has become less than the voluntary power. A frog which, before division of its cord, could lift 60 grs., directly afterwards could lift 20 grs.; fifteen minutes afterwards, 60 grs.; in twenty-five minutes it could raise 80 grs.; in an hour, 130 grs.; after four hours, 140 grs.; and forty-eight hours after the division of its cord, the reflex faculty had reached its maximum, and the frog could raise 150 grs. with its paraplegic limbs.

Magendie long ago discovered that animals poisoned by nux vomica frequently remained without convulsions, as long as they were preserved from the contact of external stimuli; but that convulsions could be immediately produced by irritating or even touching the animal's skin. If in a frog whose brain and medulla oblongata have been removed, strychnine be introduced into the stomach, no convulsions take place so long as the animal is undisturbed; but if the skin be touched, tetanus occurs at once. In birds, cats, or reptiles, if the whole portion of the spinal cord supplying nerves to the posterior limbs be removed, and a solution of strychnine be injected into the rectum, convulsions can only be excited in the anterior parts of the body where the corresponding part of the spinal cord is entire. No direct application of this poison to the surface of the muscles, nor any injection of its solution into a limb separated from the body, will produce convulsions. Again, if a ligature be placed on the abdominal aorta, and strychnine be injected into the general circulation, universal tetanus ensues; in this case no poison has reached the lower limbs. Once more, if all the arteries going to the spinal cord be divided, and strychnine be introduced into the blood, no convulsions can be excited. From these experiments, our author concludes that this poison acts neither on the muscles nor nerves, but produces tetanus by its stimulating effect on the reflex function of the spinal cord.

(*c.*) Sir Charles Bell's discovery of the sensitive and motor roots of the spinal nerves, and his conclusions as to the existence of corresponding columns in the cord, induced many physiologists to repeat his experiments. MM. Magendie, Mayo, Fodera, Schoeps, and others, by a more extended series of investigations, confirmed the former part of his discovery, but disproved the deduction he made from it, on the sensitive and motor functions of the corresponding columns of the spinal cord. Though these were the general results, yet the discrepancies in the effects of particular experiments were remarkable. Longet, by more careful manipulation, and by avoiding many sources of error, discovered, by complete transverse division of the cord, and by employing galvanism to the seg-

ments of the different columns, that the posterior columns were sensitive and centripetal, that the anterior were motor and centrifugal, and that stimulus of the grey matter appeared to produce neither sensation nor motion.

This view, with some slight modification, has been the one generally accepted; and the most popular opinion on spinal physiology has held, as regards the columns, the views of M. Longet, and has considered the grey matter as neither sensitive nor motor, but a reflector of impressions from sensitive to motor nerve-roots.

M. Brown-Séquard concludes that the posterior columns are sensitive, that they do not conduct directly to the brain; but convey impressions to the grey matter of the cord, which transmits them onwards: that the conductors of sensitive impressions, whatever they may be, on their entrance into the cord, for the most part pass downwards, and join the grey matter below their point of entrance; that a few ascend and join the grey substance above their point of entrance; and that a still smaller number at once lose themselves in the centre of the cord. All these fibres effect their crossing from side to side in the spinal cord, and no crossing of sensitive fibres takes place in the brain or medulla oblongata.

The anterior and lateral columns are motor and centrifugal, their fibres pass directly onwards from the cerebrum, and effect their crossing in the lower part of the medulla oblongata.

The grey matter of the cord receives sensitive impressions from the posterior roots of the nerves, conducts them onwards to the brain, or reflects them to the motor nerves. It is itself insensible to mechanical or galvanic stimulus.

The experiments and pathological facts that have led our author to his conclusions on the course and functions of the posterior columns, are the following:—A lateral half of the spinal cord being divided at the tenth dorsal vertebra in any mammalian animal, it is found that sensibility is increased in the posterior limb on the side of section; while sensation is lost in the posterior extremity of the opposite side. If, instead of one transverse hemi-section, two or three be made at different points on the same side, the same result will ensue. If two transverse hemi-sections, an inch apart, on the same side of the cord, be joined by a longitudinal median section of the cord, and the piece thus included be removed, the effect will be the same as in the previous experiments.

In making a transverse section of a lateral half of the cord, if the incision deviate so as to divide part of the grey matter of the opposite side, sensation will be impaired on the side of section, and will be lost on the opposite side. If, after a transverse section has been made of one lateral half of the cord at the eleventh dorsal vertebra, the opposite half be divided at the sixth dorsal, sensibility is lost in both posterior limbs, though there may be traces of sensibility on the side corresponding to the highest section of the cord. If in a rabbit, after having divided a lateral half of the cord at the level of the second pair of nerves, the sensitive nerves supplying the ears be examined, it will be found that the ear on the side of section is abnormally sensitive, while the opposite one has lost nearly all sensation. If a complete antero-posterior fission of the

cord be made at the cervical enlargement, both anterior extremities lose their sensibility, while the posterior limbs are but slightly affected. If, in the same spinal cord, a transverse division of a lateral half of the cord be made at the centre of the longitudinal section, the opposite posterior limb will become insensible, while the posterior extremity on the side of section will be unaffected.

The difficulty of meeting with diseases in the human subject which affect one-half of the cord, while they leave the opposite half free to perform its functions, has prevented M. Brown-Séquard from collecting a large number of cases in support of these experiments on animals. Nevertheless, he has brought together abundant evidence to prove the truth of his statements, from several cases. We select the following, as well illustrating many of the foregoing conclusions.*

1. A patient was admitted into the St. André Hospital, at Bordeaux, his symptoms were the following:—paralysis of voluntary movement on the right side of the body, with unimpaired sensibility. Motion perfect on the left side, with loss of sensation. After death a fungoid growth was found pressing on the right lateral half of his spinal cord.

2. A patient was admitted into the same hospital; he suffered from loss of voluntary power in the arm and leg of the left side, the same parts on the opposite side had nearly lost their sensibility. After death a clot of blood was found in the left lateral half of the spinal cord, in the cervical region.

3. A man, after having felt a sudden and severe pain in his back, lost the power of voluntary movement on the right side; sensation was not affected; on the left side, where motion was not affected, he completely lost sensation. After death a clot was found in the right side of the grey matter of the spinal cord, close to the anterior columns, in the cervical region.

The preceding cases and experiments tend to prove that the sensitive fibres cross in the spinal cord. Many anatomists have held that they cross either in the lower part of the medulla oblongata, or in the pons Varolii; if this were true, diseases of the pons or medulla should produce paraplegia, but from a collection of cases* it appears that disease of one-half of the pons or medulla produces loss of sensation in the opposite side of the body only. The following experiments induced M. Brown-Séquard to form the opinion already stated, on the functions of the posterior columns, and on the direction of their fibres. If the posterior columns of the spinal cord be successfully divided in a sheep or dog, it will be found, after the intense pain of the operation has passed away, that the animal can walk, though it has lost all sensation in the parts below the section. If the cut ends of the posterior columns be now irritated, the lower segments will be found far more sensitive than the upper. If the grey matter be accidentally wounded in making the section of the posterior columns, the lower segment of these columns will lose its sensibility, while the upper remains normally sensitive. When all the spinal cord, except the posterior columns, is divided, there is complete paralysis of both sensation and motion below the injury. In all cases of section of the

* Experimental and Clinical Researches on the Anatomy and Physiology of the Spinal Cord. By E. Brown-Séquard, M.D.

posterior columns, provided that the grey matter was intact, the lower ends of the columns were invariably hyperæsthetic; and in no case did irritation of the grey substance produce either sensation or motion, though its perfect integrity was essential to the conveyance of impressions to the brain. If the posterior columns be divided, and the cut extremities be separated from their connexion with the cord for a short distance, the lower segment will be found more sensitive than the upper. Consistently with this downward direction of sensitive fibres in the cord, is the result of section of the posterior columns in the medulla oblongata, at the point where they form the restiform bodies; section here deprives the restiform bodies of sensation for some distance above the point of injury.

When a portion of one posterior column is included between two transverse sections, three-quarters of an inch apart, the cephalic segment will be found to be sensitive, the caudal hyperæsthetic, while the intermediate portion will have nearly lost all sensibility.

The functions of the anterior columns, and the course of the voluntary motor fibres in the cord, are more easily demonstrated by experiments. Complete longitudinal fission of the cord in an antero-posterior direction, does not affect the voluntary movements of the parts below. Transverse section of a lateral half of the cord produces paralysis of motion on the side of section, and loss of sensation on the opposite side. The crossing of the voluntary fibres does not take place in the spinal cord, but is probably effected at the decussation of the anterior pyramids, at the lower part of the medulla oblongata. In proof of this, M. Brown-Séquard adduces many experiments, and has collected several cases of disease in the human subject, all of which strongly support his opinion.

To sum up the different paralyses produced by disease in the several parts of the brain and spinal cord in man, we may say, 1st. When the disease is situated in any part of one half of the brain, except the medulla oblongata at the decussation of the pyramids, there will be cross paralysis of both sensation and motion. 2nd. When the disease occupies a lateral half of the inferior part of the medulla oblongata, at the decussation of the pyramids, paralysis of voluntary movement will take place on both sides of the body below the disease, while sensation will be lost only on the opposite side. 3rd. If disease implicate one lateral half of the spinal cord, voluntary movement will be lost on the corresponding side of the body, and sensation will disappear from the opposite side.

M. Brown-Séquard lays great stress upon the consideration that, as in the case of the grey matter of the cord, a part may possess the faculty of transmitting impressions, while itself is wholly insensible to those impressions. This observation loses somewhat of its interest, when we consider that a nerve fibre, or a nervous centre, sensible to its natural and immaterial stimulus, may be entirely insensible to our coarse and mechanical irritations by galvanism or otherwise.

(*d.*) As to the conveyance of impressions by nerve fibres,—M. Brown-Séquard supposes a typical nerve-fibre to consist of an axis-cylinder, the white substance of Schwann, and a membranous neurilemma; and has concluded, as the result of his investigations, that the part of a nerve fibre essential to the conveyance of impressions is probably the membranous neurilemma.

Of the three elements of nerve fibres: the axis is found wanting in many nerve-fibres, and the coagulation of the white substance of Schwann does not affect the transmission of impressions; thus these two elements are excluded, and there remains but the membranous neurilemma, which our author states to be the essential part of a nerve fibre.

(e.) The numerous experiments performed by M. Brown-Séquard have given him unequalled opportunities of observing the effects of certain injuries on the nervous system, and of ascertaining the power of repair possessed by nerves and nervous centres.

One of the most strange effects of injury to the spinal cord may be noticed in guinea-pigs and other animals in whom complete or semi-transversal section of the lower dorsal cord has been made. In these animals a convulsive affection comes on within twelve or fourteen days from the time the cord was divided. It consists in occasional attacks of convulsive spasm, affecting first the muscles of the head and face, including those of the eye, the tongue, and the lower jaw, and thence extending to the trunk and lower extremities. If a lateral half only of the cord be divided, the posterior limb of the opposite side is unaffected by the general spasm; if the transverse section of the cord be complete, neither of the posterior limbs is affected. These fits may occur quite independently of any external stimuli, or they may be produced at will, by frightening or pinching the animal. Of all parts of the body, irritation of the skin of the face or neck on the side of section will most surely produce an attack. The liability to this affection continues during many months, and in occasional cases has remained for a year or two. M. Brown-Séquard, during his recent visit to London, exhibited at St. Bartholomew's Hospital a guinea-pig, in which he produced a fit by pinching the skin of the face on the side of section. Very soon after the irritation of the skin, the muscles of the face began to quiver, then became convulsed, and in less than a minute the animal was stretched on its back, with its limbs extended, and with every muscle in its body (excepting those of one posterior limb) in a state of violent convulsive spasm. This continued for a minute or two, when an apparently involuntary discharge of fæces took place, and the animal began to regain its consciousness, and soon assumed its natural position, although for some minutes afterwards it had a stupid semi-conscious look. The whole fit lasted about five minutes, and to an ordinary observer was undistinguishable from epilepsy, though it is said to differ from the latter in that consciousness is not completely lost, the animal remaining sensible to a strong and painful stimulus. For some time after the recovery from a fit it is impossible to excite a fresh attack. All animals experimented on are not found liable to this affection in the same degree; guinea-pigs confined in a small space and largely fed were seized with violent and frequent convulsions; while those that were sparely fed and allowed to run about were either completely cured or suffered from the attacks much less frequently. The results of treatment on more than a hundred epileptic guinea-pigs are thus summed up by our author:—1. For each epileptic animal the number of fits in a given time is generally in a direct proportion to the quantity of food eaten. 2. There is an inverse proportion between the amount of exercise and the number of fits. 3.

Cauterization of the mucous membrane of the larynx is the most efficacious plan of treatment.

Among the effects of injuries to the nervous system, we have here placed a list of the various injuries that produce turning and rolling movements. These may be classified as—1st. Those that produce rotatory movements towards the injured side; and 2nd. Those that cause rolling on the opposite side to the injury. Under the first head are injuries or punctures of the crura cerebri; the corpora quadrigemina; the pons Varolii; the posterior part of the processus cerebelli ad pontem; the auditory nerve; the medulla oblongata at the origin of the facial nerve; the medulla oblongata outside the anterior pyramids; and the posterior surface of the medulla oblongata. Under the second head are injuries to the posterior extremity of the thalami optici; the crura cerebri; the anterior part of the processus cerebelli ad pontem; a small part of the medulla oblongata at the nib of the calamus, and injury to the facial nerve near its origin. M. Brown-Séquard has discovered a new movement performed by animals in whom the corpora quadrigemina and pons Varolii on one side have been punctured. After this injury the body of the animal remains straight, but when it walks it moves sideways, instead of going forward. In turning, it describes a circle, of which the longitudinal axis of its body is a radius; while its head is at the circumference, and its tail directed towards the centre.

(*f.*) The power of repair possessed by nerves and nervous centres is considerable. Wounds of the spinal cord may heal; and even after complete transverse section, the cord will unite and eventually regain its function. Divided nerves it is well known will re-unite and regain their power of transmitting impressions; in a guinea-pig, whose sciatic nerve had been divided and had re-united, no trace of union was visible, either to the naked eye or by microscopic examination, eleven months after its division.

In reviewing the effects of injuries to the spinal cord, M. Brown-Séquard comments strongly on the fallacious idea of danger attached to the exposure of the cord; and in the case of man, contrasts the comparative safety of its exposure with the almost certainly fatal results of its compression, and concludes by advocating the operation for raising the neural arches when depressed by violence and when interfering with the function of the spinal cord.

(*g.*) *The Sympathetic System.*—Budge, Waller, and Bernard agree with M. Brown-Séquard in considering the cervical sympathetic to have its origin in the spinal cord, and to be thence continued upwards to the brain. The general effects of section of the cervical sympathetic are well known and recognised as congestion and hyperæsthesia in the part to which the nerve is supplied. If galvanism be applied to the divided nerve, and it be stimulated to action, the bloodvessels begin to contract, and all the effects of congestion, the increased heat, vascularity, hyperæsthesia, and the contraction of the pupil, disappear. The effect of paralysis of the cervical sympathetic may be closely imitated by hanging an animal with its head downwards for ten minutes; this will quickly produce contraction of the pupil, suffusion of the eyes, increase in the vascularity, heat, and sensibility of the head and face. This similarity in

effect indicates, what is very probable, that in both cases the same cause is in operation, namely, congestion; in the one case the effect of paralysis of the bloodvessels, in the other the result of the dependent position of the head.

These facts help to elucidate the hitherto anomalous results of galvanization of the vagus, as performed by Professors E. H. and E. Weber, who announced that if the pneumogastric nerve or medulla oblongata were excited by a powerful electro-magnetic stimulus, the movements of the heart were suddenly stopped. This is true if the extremity of the nerve alone be galvanized, but if the galvanic current be suffered to pass through the nerve and the muscular substance of the heart, the heart continues its pulsations until the galvanic current is interrupted, when it ceases to beat. From the effects of stimuli on other muscles, this is what should happen if the cessation were the result of permanent contraction; but after death the muscular substance is found flaccid and the bloodvessels empty. M. Brown-Séquard explains this in the following way. Considering that the vagus is chiefly a sympathetic nerve, and that its ultimate distribution is principally to the bloodvessels of the heart, and holding that these bloodvessels contain the stimulus to the rhythmical movements of the heart, it follows that the cessation of pulsation is the ordinary effect of stimulus on a vaso-motor nerve,—namely, contraction of the bloodvessels to which it is supplied, which, by emptying the capillaries, deprives the heart of stimulus to action. But when the galvanic current passes through the muscular substance, it substitutes a direct stimulus to its muscular irritability in place of the blood in its capillaries.

IV. *The Muscles.*—Our author's investigations on the muscular system bear chiefly on the condition of the muscles after death, and on the effect of the injection of blood in restoring and sustaining muscular irritability. These latter we have noticed elsewhere, as well as the contractions observed in the various contractile tissues after death by asphyxia, which will be found in a former part of this paper under the subject of the Blood.

(*a.*) *Rigor Mortis.*—In all cases in which, immediately before death, muscular irritability has been exhausted by prolonged or energetic muscular contraction, there is a proportionately quick approach and short duration of the rigor mortis, with a speedy supervention of putrefaction. In over-driven oxen, in animals hunted to death, in cocks killed in fighting, these effects are commonly observed. After death by strychnine and the various poisons producing convulsions, they may be seen in a higher degree, and in death by lightning they reach their maximum.

If to one dog strychnine be administered in a sufficient dose to cause death in a single convulsion, while to another it is given in such a dose as will cause death after about twenty or thirty convulsions, eight days will ensue before putrefaction is established in the former; but in the latter it will be found to exist eight hours after death. These experiments were performed at a temperature of 46° Fahr., and various poisons were used which it was found would produce the same effects; among these were morphine, nicotine, and hydrocyanic acid.

John Hunter stated, that in men and animals who were killed by lightning no rigor mortis followed. This assertion has recently been denied by Mr. Gulliver; it seems probable, from M. Brown-Séquard's investigations, that, if it does ensue at all, it only lasts for a few seconds, and does not remain sufficiently long to be recognised as post-mortem

rigidity. As far as possible, the effects of lightning have been imitated on several mammalian animals; and we proceed to give the results of galvanic shocks of different intensity on five rabbits. When the hearts had been removed from all, one was suffered to die without galvanism; the others were subjected to galvanic currents, increasing in intensity from the first to the last. In the first animal who was suffered to die, rigor mortis lasted for 192 hours; in the second, for 144 hours; in the third, for 72 hours; in the fourth, for a day; and in the last, in whom the galvanic current had been strongest, rigor mortis only continued for fifteen minutes. Our author contends that if he can, by galvanization, reduce the duration of post-mortem rigidity to so short a period, the action of lightning, which far surpasses galvanism in the intensity of its action, may reduce the duration of rigor mortis to a minimum.

We here close our account of M. Brown-Séquard's discoveries, and would refer the reader to the work entitled 'Notices sur les Travaux,' for a more full account of many of his investigations. Our summary of the results of the inquiries of M. Brown-Séquard, can give but a faint impression of the amount of labour and the acuteness of mind required to arrive at the conclusions we have enumerated. Let the reader imagine how much ingenuity would be required to plan such experiments as we have referred to; how much dexterity to execute them; what patience to watch them—often through many weeks of daily or even hourly observation; what clearness of apprehension to interpret them aright; and what fulness of knowledge to compare such interpretations with the admitted truths of physiology, or to weigh them against its previously admitted errors,—let the reader, we say, imagine all this, and he may then form some fair estimate of the scientific merit of M. Brown-Séquard.

Thomas Smith.

Review IX.

1. *Descriptive and Illustrated Catalogue of the Histological Series contained in the Museum of the Royal College of Surgeons of England prepared for the Microscope.* Vol. II. *Structure of the Skeleton of Vertebrate Animals.*—*London*, 1855. pp. 248.
2. *Manual of Human Histology.* By A. Kölliker. Translated and edited by George Busk, F.R.S., and Thomas Huxley, F.R.S. (Sydenham Society.)—*London*, 1853. Vol. I. pp. 498.
3. *Human Osteology.* Comprising a Description of the Bones, with Delineations of the Attachments of the Muscles; the General and Microscopic Structure of Bone and its Development. To which is added, a Brief Notice of the Unity of Type in the Construction of the Vertebrate Skeleton. By Luther Holden, F.R.C.S., Demonstrator of Anatomy at St. Bartholomew's Hospital.—*London*, 1855. pp. 204.
4. *Osteological Memoirs.* No. I. *The Clavicle.* By John Struthers, M.D., Fellow of the Royal College of Surgeons of Edinburgh, Lecturer on Anatomy.—*Edinburgh*, 1855. pp. 90.

So universally is it recognised that a correct knowledge of the bone forms the groundwork of practical anatomy, that we need not be sur-

prised at the appearance of two new works on Osteology. The one is intended as a text-book for students, but is equally serviceable as a book of reference to the surgeon. The other, of which the first number—which treats on the Clavicle—is alone before us, goes into its subject far too elaborately to have a chance of being a student's book, but records observations on the bone with an accuracy that will make it a valuable aid to the surgeon or lecturer. We remember when the so-called French anatomy was first introduced into our schools, the sort of contempt which was expressed at what was considered its unnecessary minuteness. How astonished would people have been at seeing a work of ninety octavo pages devoted to one small bone alone! Why, Cruveilhier, who was thought to have exhausted the subject of descriptive anatomy, dismisses it in six pages; yet Dr. Struthers has shown that a great number of very useful and practical observations were still to be made, and we hope that he will continue his memoirs on other bones. Nothing in nature is too minute or trivial to be unworthy of patient investigation, and we are quite of opinion with the author, that

"Each new discovery, or method, or addition, opens the way to further research and thought, and each new and greater application brings out new facts and principles, which gradually unfold themselves under the patient exercise of observation and thought, the combined use of the bodily and mental eye."*

The study of the minute anatomy and development of bone is to the histologist what that of the special anatomy of the skeleton is to the surgeon or comparative anatomist. The properties of permanence and resistance, which bone must necessarily possess to fit it for its office, render it especially available for microscopical investigation. The changes which take place in its development from cartilage—the arrangement of its tissue—the nature of the processes by which it grows or is renewed—can all be observed under fewer interfering circumstances than perhaps any other tissue in the body. Hence cartilage and bone afford the readiest means for investigating structure and development; and although the subject be special, yet whatever can be accurately determined with regard to it, will throw additional light on what is known of other tissues. The Palæontologist also finds his advantage in studying the minute structure of bone. There are certain general differences of character in the bone tissue of animals, the discrimination of which has led to the determination of the position of extinct animals, where portions only of their bones have been found.

Towards the attainment of this latter object, the work which stands first on our list is by far the most valuable aid which has appeared. The histological department of the museum of the Royal College of Surgeons bids fair, under the able direction of Professor Quekett—to whom it owes, we might almost say its existence—to rival in completeness its more imposing neighbour. We believe that when Mr. Quekett was first connected as a student with the Hunterian Museum, it possessed only about 150 microscopical specimens, which, according to Mr. Clift's report, were made by Hewson. In 1841, the Council purchased the collection of the late Dr. Todd, of Brighton, containing 1558 specimens. Since Mr.

* Osteological Memoirs, preface, p. iv.

Quekett became connected with the museum, we understand that up to the time of the publication of the Catalogue, between 8000 and 9000 specimens have been added by him, or under his direction; and every day, new and valuable additions are being made by him. In the year 1848, he began the formation of the 'Histological Catalogue,' the second part of which is now before us. None but those who have attempted the task can appreciate the vast amount of labour, and of very uninteresting labour too, to those who have made the preparations, which has been here accomplished. In the present part, accurate descriptions of no less than 945 specimens of the minute structure of the bones are recorded, illustrated by 440 drawings of the four classes of vertebrata, recent and fossil. The subject, for all practical purposes, may be looked on as exhausted; for though, of course, the structure of the bones of a large number of genera is not here described, yet any more detailed account would add little or nothing of real value, as it would be but a repetition of what is amply illustrated in the work.

Prefixed to the descriptive catalogue is a short account of the structure and development of bone, a subject on which we purpose presently to make a few observations. Professor Quekett was the first to draw attention to the fact that there seems to be a relation between the size of blood-corpuscles and of lacunæ. He here repeats the observation:

"A remarkable relation in point of size has been found to exist between the blood-corpuscles and the lacunæ of the same animal: thus, for instance, in the siren and lepidosiren, animals having the largest blood-corpuscles, the lacunæ are also the largest; in the sloths, the blood-corpuscles are larger than in any mammal, except the elephant; in one of these—the three-toed species—the lacunæ are the largest. There are, however, some few instances in which this rule has been departed from, and these are alluded to in different parts of the present volume."*

In looking through the measurements of the lacunæ given in the descriptions, and comparing them with the ascertained measurements of the blood-corpuscles of the same animals, this observation appears to be, to a great extent, correct. Still there are many exceptions—some so striking as to raise a doubt whether there can be any essential connexion between the dimensions of these two structures. Thus, birds with far larger blood-corpuscles have generally smaller lacunæ than mammals; and even in comparing animals of the same class, the absence of this connexion is very marked. The musk-deer, for example, with the smallest blood-corpuscles, has lacunæ not much smaller than the mouse, in which the blood-corpuscles are more than three times as large, and indeed, nearly as large as in man. The question of greatest interest, however, to which the work will materially help to furnish an answer, is, whether the bone-structure presents any special differences in the different classes or orders of animals, such as are furnished by the dentine and enamel of the teeth, by which the positions of portions of bone of extinct or unknown animals might be determined? Mr. Quekett has given particular attention to this subject, and we believe that constant observation has trained his eye to a power of ready and accurate discrimination possessed by few. To those who have not an extensive collection of preparations, the plates will serve as safe and good substitutes from which to draw conclusions,

* Histological Catalogue, Introduction, p. xxiii.

or with which to compare unknown specimens. It seems clear that there are *general* characters by which the bone tissue in the four great classes of vertebrata may be distinguished, although at the confines of each class there is a tendency to gradual transition. Thus the bone-structure of the lower mammalia resembles that of birds; while in the bird there is some resemblance to the higher reptile. As might be expected, the different orders cannot be so easily recognised by the characters of the bone-tissue—especially in the higher classes. Even in the mammalia, however, there are many animals which may be thus recognised—the whalebone-whale and cachalot, for example—the monotremata, some of the marsupials, and the sloths. Some of the monkeys, even, as the spider monkey and short-tailed monkey, have peculiar characters of bone-structure.

The descriptive catalogues of the College museum are undoubtedly the most valuable records of the kind extant; and the present series reflects additional credit on the Council, under whose auspices it has been undertaken, and will remain a lasting memorial of the energy and of the extensive and accurate observation of the histological professor by whom it is compiled.

In the account of the structure and development of bone, which forms an introduction to his work, Mr. Holden adopts in general the views of the authors of this article, contained in a paper in the 'Philosophical Transactions' for 1853. The editors of the Sydenham Society's edition of Kölliker's 'Manual,' also, in the very valuable notes with which they have enriched it, while they admit their general correctness, demur to the interpretations of some of the observations recorded in that paper. More recently, Mr. Huxley, in an article of great power and ability, published in the twelfth volume of this Review, endeavours to show that the cell theory of Schwann is inadmissible in the case of many tissues, which are generally believed to be cell products; and gives an explanation of some of the appearances found in bone, based on his ideas of the laws of development.

The general views of which Mr. Huxley is the most able exponent in this country, cannot be now discussed. The article referred to demands a careful study; and it certainly indicates that the whole subject of development requires reconsideration. The negative character of the nucleated cell as an instrument of development, is maintained with great acuteness and ingenuity; and cogent reasons are undoubtedly adduced for at least a modification of the prevailing doctrines.

We may be allowed perhaps to re-state the general conclusions at which Mr. Huxley has arrived, but must refer to the article itself for the arguments in support of them.

"We have brought forward evidence to the effect that this primary differentiation is not a preliminary to further organization—that the cells are not machines by which alone further development can take place, nor, even with Dr. Carpenter's restriction, are to be considered as 'instrumental' to that development. We have tried to show that they are not instruments, but indications—that they are no more the producers of vital phenomena, than the shells scattered in orderly lines along the sea beach are the instruments by which the gravitative force of the moon acts upon the ocean. Like these, the cells mark only where the vital tides have been, and how they have acted.

"Again, we have failed to discover any satisfactory evidence that the endoplast, once formed, exercises any attractive, metamorphic, or metabolic force upon the periplast; and we have therefore maintained the broad doctrine established by Wolff, that the vital phenomena are not necessarily preceded by organization, nor are in any way the result or effect of formed parts, but that the faculty of manifesting them resides in the matter of which living bodies are composed, as such; or, to use the language of the day, that the 'vital forces' are molecular forces."*

Before entering into the question, whether in the case of bone formation, the cell does not play a more important part than is here assigned to it, it may be as well to state very briefly what we believe to be the structure of bone and the mode of its development in the higher animals.

Bone, then, may be formed in cartilage—primary bone; or in a layer or mass of cells closely aggregated, and without or with very little apparent intercellular substance—secondary bone. It is unnecessary here to re-open the discussion whether, morphologically, this distinction is or is not correct. Of one thing there is no doubt, viz.; that so-called primary and secondary bone are so different in general characters, that the smallest part of the former may be distinguished from the latter when lying embedded in it, as in the processes of growth is by no means uncommon.

When bone is about to develope in cartilage, the cells of the cartilage multiply by repeated bipartition, and increase in size to so great an extent as to encroach on and diminish the intercellular substance. Ossific granules are deposited in the intercellular substance, and at the same time the cells undergo change, partially ossify, and are found imbedded in the crypts formed by the ossified intercellular substance, their interior representing stellated lacunæ. This primary bone has usually but a short existence.

At a very little distance below the point where ossification is advancing, a process of absorption has already begun in the bone; irregularly margined spaces, of various sizes, are found, eroded, as it were, in it. These are entirely filled by masses of soft cells, so thickly clustered as to leave but little room for blastema. In these spaces the secondary bone is formed, apparently by the ossification of the hitherto soft cells and of the intercellular matrix or blastema. Again and again is this process repeated. In fact, the absorption in mass of the older bone, and the deposition of new in the spaces thus produced by absorption, are found to occur throughout life. The process is of course most frequently repeated in young growing bone, especially in the shaft of the long bones, and at the same time additions of new bone are being made to the surface by a process of ossification in all respects similar. In young bone which is thus constantly undergoing change, the tissue does not present that definite arrangement or lamination which is seen in older and more permanent tissue, and which is the result of the arrangement of the cells and of their ossification in successive layers. The lacunæ in secondary bone are not simply spaces left in the process of development, but, like those in primary bone, are cells with ossified walls imbedded in the tissue.

Now if this be a correct view of the history of bone development—and it is supported by the authority of Professor Quekett in the work before us—we think that it goes some way to indicate that cell

* British and Foreign Medico-Chirurgical Review, p. 314. Oct. 1853.

agency is at work; or, at least, that cells are made subservient to formation and growth. The adoption of such a conclusion will of course depend on the opinion of the reader as to whether the cell is ever an instrument, and is not always a result merely, of vital action.

In the whole course of the changes which occur in cartilage, from its first development to its ossification, those which are taking place in the cells are the most remarkable. At first cartilage consists of cells only, which become separated by the addition, perhaps to their walls, perhaps external to them, of interstitial substance. So long as the cartilage is simply growing, no further change takes place in them than their multiplication in an apparently irregular manner; and unless a further development into bone is intended, the cells do not alter their appearance. But the first step towards ossification seems to be not merely a multiplication, but a great increase in the size of the cells, with change of form of their contents, and the previously abundant intercellular substance is proportionately diminished. Then, and not till then, the calcareous salts, which previously existed only in very small quantity in the tissue, are eliminated from the blood, and deposited in the cells and intercellular substance. But the soft contents of the cell still remain embedded in the ossified cell wall, which now forms a lacuna. This looks as though there were a necessary connexion between cell growth and bone deposit—whether of cause and effect cannot of course be determined by the simple observation of the fact.

The connexion, however, between cell and bone formation is more striking in the instance of development of secondary bone. But we may first allude to those *spaces*, to which we have given the name of "Haversian spaces," produced by the removal of bone already formed, and which become filled up again with bone arranged in the form of Haversian systems. These spaces Mr. Huxley considers to be the effect of a process of vacuolation "strictly comparable to that described as giving rise to the areolated connective tissue." Now the description of the process of vacuolation giving rise to areolated connective tissue, certainly does not agree with anything which we have seen in the formation of Haversian spaces.

"If the portion of young gelatinous tissue," Mr. Huxley observes, "which lies immediately adjacent to the epidermis or epithelium, be examined, it will be found to present a structure in all respects similar to fœtal cartilage; that is, there is a homogeneous matrix in which the endoplasts are dispersed. If this be traced inwards, it will be found that the endoplasts become more widely separated from one another, and that the matrix in places between them is softened and altered; while in their immediate neighbourhood, and in the direction of irregular lines stretching from them, it is unaltered. This is, in fact, the first stage of that process which we have called vacuolation. In this condition the intermediate softened spots still retain sufficient consistence not to flow out of a section; but yielding, as it does, in these localities much more readily than in others, it is easy enough to tear out the firmer portion in the shape of 'cells,' which are fusiform, irregular, or stellate; and the whole tissue has therefore been described (Reichart, Virchow, Schwann) as consisting of cells, connected by an 'intercellular substance.' Both 'cell walls' and 'intercellular substance,' however, are portions of the same periplast, and together correspond with the matrix of the cartilage. When, therefore, in the course of further development, the 'intercellular substance' becomes quite fluid and so disappears, the outer portion of these cells being converted

into fibrillated collagenous tissue, and the inner into elastic substance, we have, notwithstanding the apparently great difference, in reality exactly the same mode of metamorphosis of the same elements as in the preceding instance."*

Here, then, is a clear account of a gradual and progressive change from a firm matrix down to complete fluidity. But the examination of a Haversian space shows us a cavity uniformly filled with cells, which require no tearing to separate them, but float off, free, and of uniform size, when simply placed in fluid. The boundary of the space is firm bone, quite unchanged in character, but the cells which lie in immediate contact with it in no way differ from those which lie in the more central parts, and which have been previously formed. We discover here, then, no intermediate progressive stage. The only impression which we receive is, that from some central point—probably the neighbourhood of a vessel—the bone is attacked, and removed atom by atom, its place being occupied by small granular-looking cells, "the cellular mass presenting a perfect cast of the surface of the bone, suggesting to the mind that the soft was growing at the expense of the hard tissue, or at all events, that the former was instrumental in the removal of the latter." There is, in short, no intermediate condition discoverable between firm natural bone and granular cell. Now, if the term vacuolation may be applied alike to this process and to that by which it is assumed that areolated connective tissue is formed, we do not see what advantage is gained by its introduction, as it only expresses a condition already familiarly known under the name of absorption.

This, then, is the appearance presented by a Haversian space in recent bone—a space with irregular sharply emarginated borders, and filled with small granular nucleated cells. The process by which the absorption is effected has its limits, and when these are attained a new series of changes begins. Ossification takes place in the spaces: and we believe that the mode in which it occurs is capable of easy demonstration. Whether there be any alteration in the cells in the Haversian spaces previous to ossification, cannot perhaps be determined; none, at any rate, is perceptible; but it is seen that a layer of cells lying next in contact with bone has become darker, and adheres to the bone. The cells are found, on examining the bone in a dry state, to be converted, together with some intermediate tissue, into a bony structure. Then the layer next to them undergoes a similar process, and so on, until the ossification of the part is completed. Where a Haversian system with definite lamination is to be formed, the cells are arranged row by row, each row with perhaps some intermediate tissue representing a lamina; where, however, lamination does not occur, the ossification takes place without such arrangement of the cells, the conversion of which into bone is nevertheless equally obvious. Immediately around the Haversian canal, which is left as a central space in the midst of the ossified cells, a greater or less quantity of clear homogeneous calcified matrix is found, which in the first instance is perhaps a simple transudation from the vessel.

The editors of Kölliker's 'Manual' do not admit the correctness of this view.

"We have never been able," they say, "to find evidence of any of the cor-

* Loc. cit., p. 310.

pustles becoming converted into 'osteal cells,' and we believe, for the following reasons, that this does not take place. In examining the growing Haversian canals in man, and particularly in the calf, we have frequently found the innermost layer transparent, glassy, and structureless, exhibiting nothing but the corpuscles lying in lacunæ without canaliculi. This layer would be as much as the one-two thousandth of an inch thick; in the layer immediately external to it, however, the 'osteal cells' were exceedingly well marked. The inner layer looked like smooth ice, and the outer like ice which had cracked into innumerable tolerably even portions; but these cracks were by no means produced by the canaliculi, which, as yet, were hardly at all developed. Now, it seems clear, that if the 'osteal cells' were produced by the calcification of certain of the corpuscles, they ought to be more obvious in the young inner layer than in the outer; whereas, just the reverse occurs. The fact stated by Messrs. Tomes and De Morgan, that lamination is less obvious in young than in old bone, tends to exactly the same conclusion. Again, if the granular substance between the lacunæ were composed of calcified corpuscles—'osteal cells'—the action of acids ought to bring them out as strongly as it does those of the lacunæ; whereas, neither in young bone nor in old can anything of the kind be seen."*

The description of the inner transparent lamina of recently formed Haversian systems does not materially differ from that which we have given in our paper:

"The inner lamina forms, when the development is completed, a perfect ring, and not unfrequently presents a second peculiarity. The tissue of which it is composed is transparent, and affords, with our present means of investigation, little evidence of structure."†

According to our observations, however, this transparent lamina is much more frequently seen in old than in young growing bone. The objection that lamination is less obvious in young than in old bone, requires a clear understanding as to the application of the terms young and old. By young bone may be meant, either the bone of a young animal, or the new tissue deposited in a Haversian space or elsewhere in the bone of an adult. In the long bone of a young rapidly growing animal it is true that lamination is often absent—that is, in a bone undergoing constant change there is not the same tendency to regular arrangement as in bone intended to be more permanent. But in new bone deposited in the midst of old, lamination is distinct; though sometimes, from the greater abundance of the canaliculi, it is less pronounced at first view; for the clearness of lamination is always in the inverse ratio to the abundance of the canaliculi. In either case, however, the appearance of ossified cells is clear and defined. And to the statement, that neither in young nor in old bone can any appearance of cells be found when decalcified by acids, we must express our entire dissent, as we find no difficulty in demonstrating their presence more clearly than in the unaltered bone. One thing must be insisted on—viz., the necessity for using the most perfect means of definition. What with an ordinary reflector or condenser will appear a confused mass, will often, under a Gillett's condenser, come out as a regular well-defined tissue.

Another, and perhaps a stronger, argument in favour of the view that cells minister to the development of bone tissue, may be drawn from the fact, that when ossification is taking place in connexion with fibrous

* Kölliker's Manual, vol. i., p. 378, Syd. Soc. Edition. † Phil. Trans., 1853, p. 113.

tissue—as periosteum, for example—the fibrous elements are, in whole or part, replaced by cells. This fact is the more striking if the fibrous be, as the editors of Kölliker maintain with Reichart, a homogeneous tissue with a plaited or fibrous arrangement. If the development could take place in a tissue homologous, as it is believed, with the matrix of cartilage, without the intervention of cells, why should the cell formation precede the ossification, and take the place of the previous tissue?

What, then, is the signification of these cells which are thus found to be so universally present wherever bone is forming? This is perhaps matter for conjecture only. We are inclined to suggest the following view:—The process of calcification is as much one of excretion of salts from the blood, as the separation of bile is an act of excretion of its elements or its organic compounds by the liver; or as the separation of urea is an act of excretion by the kidney. But in all glandular excretions—wherever, that is to say, any removal of special materials from the blood takes place—*there* is found the nucleated cell or nucleus; and these cells, as in the liver, or kidney, or testis, are, we believe, universally admitted to be the agents of separation. If the cells degenerate, the secretion is stopped. Indeed, wherever active processes are going on—in the higher animals, at least—there, and in a direct ratio to that activity, cells exist. Is it not probable that, in the separation of calcareous salts from the blood, the cells, instead of being merely incidental structures, in reality determine and become the seats of that process; and that, in fact, so far as the arrangement of its tissue is concerned, there is no essential difference between the formation of bone and that of horn or any other epidermic structure? It is a begging of the question to deny this on the ground of the two tissues being homologically different. Is our present knowledge of development sufficiently advanced to enable us to determine what parts are, so to speak, histologically homologous? We think not. Nor do we think that any satisfactory argument in opposition to such a hypothesis can be derived from the fact of certain lower organisms, the so-called unicellular animals and plants, possessing no structure. Mr. Huxley says in reference to them:

> "If it be once admitted that a particle of vitalizable matter may assume a definite and complex form, may take on different functions in its different parts, and may exhibit all the phenomena of life without assuming the cellular structure, we think it necessarily follows, that the cells are not the centres of the manifestation of the vital forces; or that, if they be so, the nature of these forces is different in the lower organisms from what it is in the higher; a proposition which, probably, few would feel disposed to maintain."

Now, we confess that, either we do not clearly understand this argument, or it is one which, if pressed to its legitimate conclusions, would require us equally to admit that a nervous system, where it exists, is not the centre of the manifestation of nerve force, or muscle of contractile force, because both volition and contraction are manifested in animals possessing neither of these systems.* If the special manifestations of vital force are made dependent in the higher animals on special organization, surely that manifestation of it which results in the formation of definite structure may be made equally dependent on organization. But, it may be argued, there are many of the lower animals possessed of complex in-

* British and Foreign Med.-Chir. Review, vol. xii., p. 804, Oct. 1853.

ternal structures, yet in whom no cells are found taking part in, or co-existing with, their development—in whom, in short, the nucleated cell does not make its appearance at all in connexion with these structures. Be it so. If, however, this be proved, we think it is a fact which cuts both ways—or rather, that it is one which entirely bears out the cell theory. Before, however, entering on this question, we may refer to a paragraph in Mr. Huxley's paper which seems to embody his views on the meaning of the presence of cells in the animal body:

"As the whole animal is the result of a differentiation of a structureless yelk, so is every tissue the result of a differentiation of a structureless blastema; the first step in that differentiation being the separation of the blastema into endoplast and periplast, or the formation of what is called a 'nucleated cell.' There, just as in the development of the embryo, when the blastodermic membrane is once formed, new organs are not developed in other parts of the yelk, but proceed wholly from the differentiation of the blastoderm; so, histologically, the 'nucleated cell,' the periplast with its endoplast, once formed, further development takes place by their growth and differentiation, into new endoplasts and periplasts. The further change into a special tissue, of course, succeeds and results from this primary differentiation, as we have seen the bodies of the vertebræ succeed the chorda dorsalis. But is there any more reason for supposing a causal connexion between the one pair of phenomena than between the other? The cellular structure precedes the special structure; but is the latter therefore the result of a 'cell force' of whose existence there is, on other grounds, no evidence whatever? We must answer in the negative. For us, the primarily cellular structure of plants and animals is simply a fact in the history of their histological development—a histologically necessary stage, if one may so call it, which has no more causal connexion with that which follows it than the equally puzzling morphological necessity for the existence of a chorda dorsalis or of Wolffian bodies has with the development of the true vertebræ or of the true kidneys."*

Without stopping to inquire what proof there may be that there is no causal connexion between the existence of the chorda dorsalis and the development of the true vertebræ, we may return to the question, whether the fact, if it be one, that in some of the lower animals the development of complex organs occurs without the intervention of cells, is not, on the whole, favourable to the cell theory as applied to cases in which cells do exist, and to the same extent opposed to the views of Mr. Huxley. We would wish it, however, to be expressly understood, that we are not in a position to support or deny the *universal* application of Schwann's theory to animal development, but are arguing only in favour of its probability in relation with certain tissues of vertebrated animals.

If it were found that the first step from a structureless blastema towards the formation of a perfect tissue was invariably the formation of a cell, it might be plausibly assumed, unless direct evidence to the contrary could be shown, that the cell was a mere intermediate stage—a necessary result of a differentiation into endoplast and periplast, not itself an instrument, but only an indication. But if, as is believed, development can and does take place in animals possessed of complex structure, without any such intermediation, it would be only fair to conclude that the presence of cells in connexion with development is something more than an indication, and is really an evidence of some modification of the mode in which it takes place, and to which they are instrumental. Could it be maintained that

* Loc. cit., p. 303.

the absorbent gland, for example, which is nothing more than a compact plexus of absorbents, containing an abundance of nucleated corpuscles, is not an active agent, because in the lower animals there are no absorbents at all? or that the red-blood corpuscle, which is either a cell or a nucleus, is not an active agent because development goes on, and all kinds of animal and organic functions are performed in the lower animals without its presence? No one would deny, we imagine, that in these and many other instances, the presence of the cell elements is a sufficient proof of some higher, or at least some modified, manifestation of vital force of which they are not the indication, but the instruments. And we see no reason whatever why the same argument should not apply to the cell, wherever found, inasmuch as its presence is not a necessary condition of development.

What share may be taken by the nucleus, or what by the cell wall, in any change which goes on in or around them, is a point perhaps impossible to determine. Looking to the simple fact, that when a tissue is growing or active, the nuclei are usually abundant; but that in general, when it has arrived at maturity, or degenerates, they disappear, the impression is naturally given, that these organs may be of more importance than many are disposed to admit. In our minds, this impression is strengthened by observing the nature of the lacunæ. They appear as small cavities, and, as is generally allowed, they contain nuclei. The importance of this depends very much on the real mode of their development. Are they merely spaces left during the calcification of the surrounding tissue? or are they cavities contained in walls formed by the ossification of a separate element? If the former, it might be argued that they are the necessary consequences of ossification occurring round a structure not prone to ossification; and that hence, whatever might be the use of the lacunæ themselves, the corpuscles or nuclei within them merely determined their position. But if the latter view be correct, it is not so easy to explain their formation on the supposition of their contents being accidents and not essentials. This view, however, we believe to be the right one, and not difficult of demonstration. At present we would only draw attention to the fact, that in certain situations, as in the cancelli of the flat bones of very old persons, ossified lacunal cells are found, some free, some attached to or imbedded in bone tissue. They consist of a granular cell, containing a nucleus, and surrounded by a thick transparent wall. That they are lacunal is shown by the fact that they are found at times imbedded in bone, and, like the cartilage cells, display every gradation, from the granular cell to the finished lacuna. The editors of Kölliker's 'Manual' suggest that they may be compared rather to the globules of dentine than to cells. But is it proved that the dentine globules are not ossified cells? If these bodies be really detached lacunal cells, does it not indicate that the lacuna, with its contents, is a distinct organ? and can it be that such an organ should be simply an indication, not an instrument? In the perfect lacuna, the only parts recognisable are the osseous wall and the nucleus; and this latter is the only part capable of undergoing or determining change, supposing such to be the office of the lacuna. But if the lacuna is not destined to some special purpose, why is it present at all? So far as the mere conveyance of

nutritive fluid is concerned, the canaliculi would answer all the purpose. The fact, however, of the lacunæ in new bone being large, and the canaliculi proceeding from them numerous (the canaliculi being formed by a secondary process), and of the lacunæ in old bone being small, and the canaliculi few, with occasional obliteration of some of them, indicates a more than accidental connexion between the presence of these organs and the process of development and nutrition.

What may be the actual agency of these parts, it is of course impossible, in the present state of our knowledge of vital processes, even to surmise. All we would wish to be understood as maintaining is, that while, perhaps, good grounds have been adduced for assuming that, in many cases, phenomena which have been attributed to cell agency, are really due to molecular forces residing in all living matter however organized (and no one, we believe, can study the observations of the editors of Kölliker, and the admirable papers by Mr. Huxley on the subject, without coming to that conclusion), yet that there are facts connected with the structure and growth of bone (amongst other tissues) which will not permit us altogether to discard the hypothesis of cell agency as a means of development.

We have dwelt so long on the subject of bone development, that we have little space to devote to the remainder of Mr. Holden's work. Its object is, as the author states, "to teach the student the bones and the accurate attachment of the muscles." This object the work is well calculated to fulfil. The descriptions of the bones are full and minute, couched in plain intelligible language, and interspersed with many valuable practical observations. The drawings of the bones are made more available for reference by having the names placed opposite to the various points of demonstration, instead of figures referring to the letterpress. The plan of the plates is in one respect novel. The attachments of the muscles are indicated in coloured outline—the origin in red, the insertions in blue ink—and hence, as the names of the muscles are in each case placed within or near the outline, an inspection of the plate would afford to the student a good notion of the most important points in the anatomy of the bone. Altogether, we know of no work on osteology better suited to aid the student in acquiring a knowledge of this most essential branch of anatomy.

The latter part of the book is devoted to a consideration of the homologies of the vertebrate skeleton. The author tells us that this portion of the work has been supervised by Professor Owen, and, as we need scarcely mention, he adopts entirely the views of that distinguished anatomist. So far as is possible, he has divested the subject of technicalities, which is perhaps doing as much for it as could at present be expected.

C. De Morgan.
T. Tomes.

Review X.

General Board of Health. Instructional Minute relative to the Duties and Qualifications of Officers of Health in Districts under the Public Health Act, 1848. (Issued Dec. 20, 1855.) pp. 6.

The hundred and thirty-second clause of the hundred and twentieth chapter of the eighteenth and nineteenth of Victoria has caused more commotion in the medical coteries of the metropolis, since the passing of Sir Benjamin Hall's bill, which is typified by the formula "18 and 19 Victoriæ, cap. 120," than has probably ever been excited in the profession by so brief a passage. Though only a fractional portion of the bill, we cannot, as sanitary reformers, regard the clause otherwise than as one of its most important features. As but few of our readers may have met with the act, we give the clause entire:

"Every vestry and district board shall, from time to time, appoint one or more legally-qualified medical practitioner or practitioners, of skill and experience, to inspect and report periodically upon the sanitary condition of their parish or district, to ascertain the existence of diseases, more especially epidemics, increasing the rate of mortality; and to point out the existence of any nuisance, or other local causes, which are likely to originate and maintain such diseases, and injuriously affect the health of the inhabitants; and to take cognisance of the fact of the existence of any contagious or epidemic diseases, and to point out the most efficacious mode of checking or preventing the spread of such diseases; and also to point out the most efficient modes for the ventilation of churches, chapels, schools, lodging-houses, and other public edifices within the parish or district; and to perform any other duties of a like nature which may be required of him or them. And such persons shall be called medical officers of health; and it shall be lawful for the vestry or board to pay to every such officer such salary as they think fit, and also to remove any such officer at the pleasure of such vestry or board."

The act acknowledges the duty of society to seek for the best information which science is able to afford in relation to the causation and prevention of disease; and it inculcates the necessity of applying to the medical profession as the only true authority on such matters. The parochial officers have had no such functions to perform; they were appointed for the purpose of treating disease after its appearance in the individual, though under a properly organized system of medical police throughout the country they might be rendered most valuable *aides-de-camp* of the officers of health.

The new medical officers of health receive their commission to act on the defensive, and to prevent and anticipate the inroads of the enemy, by means that shall at the same time enhance the value and enjoyment of life. The general outline of their duties, which is given in clause one hundred and thirty-two of Sir Benjamin Hall's act, embraces subjects to which medical men have turned their attention more than members of other professions; but it is very certain that, although the necessity for medical officers of health has long been felt, the new act will create a new order of medical men, whose special studies will be devoted to the matters adverted to. At present, we are acquainted with but few whose acquirements and practical knowledge would enable them, without further preparation, duly to respond to the call. This difficulty becomes yet more apparent when

we examine the 'Instructional Minute' issued under the sanction and with the signature of the present President of the Board of Health.

Of this 'Minute' we cannot speak too highly. It throws a great responsibility upon the medical profession. It forms an exalted estimate of the duties to be performed, while it demands qualifications such as are to be found only among the best of our profession. In addition to a thorough general knowledge of medicine, the 'Minute' justly requires special qualifications in pathology, vital statistics, in chemistry, in microscopy, and in natural philosophy; we may add, in geology. We cannot sum up the reasons for such qualifications better than they are to be found in the official document. The officer of health must be well grounded

"In *pathology*, because this science implies an exact study of the causes of disease in their relation to the living body,—a study of what they are, and how they act, and why they seem to vary in operation:

"In *vital statistics* (properly a section of pathology), because, by analysing the composition of various death rates, and by learning how the pressure of particular diseases differs under different circumstances of climate, season, dwelling, age, sex, and occupation, definite standards of comparison are gained, without which the officer of health could not estimate the healthiness or unhealthiness of the population under his charge:

"In *chemistry* (including the power of microscopical observation), because without such aid there can be no accurate judgment as to impurities of air and water, dangerous impregnations of soil, or poisonous admixtures in food; and because the same science also guides the application of deodorizing and disinfectant agents:

"In *natural philosophy*, because many nuisances are traced, and many questions as to ventilation and over-crowding are answered by its laws; further, because by its aid the officer of health studies the atmospheric changes, and learns the climate of his district—important steps in proceeding to speak of its diseases; and finally, because natural philosophy in conjunction with chemistry renders him competent to report on many manufacturing processes alleged to be hurtful to health, and on the sufficiency of such means as are employed to reduce the evils ascribed to them." (pp. 3, 4.)

Further arguments why the medical officer of health should be possessed of these qualifications will become apparent by a perusal of the enumeration of the duties required of him. Thus he is to make himself acquainted—

"With the levels, inclinations, soil, wells, and water-springs of the district; with its meteorological peculiarities; with the distribution of its buildings and open spaces, paved or unpaved; of its burial grounds and laystalls; with the plan of its drains, sewers, and water-supply; with the nature of its manufacturing and other industrial establishments; with the house accommodation of the poorer classes, and the facilities afforded them for bathing and washing; with the arrangements for burial of the dead, and with the regulations in force for lodging-houses and slaughtering-places; for the cleansing of public ways and markets; and for the removal of domestic refuse."

Of course it is necessary that the medical officer should be familiar with all these matters, in order that he may understand the various influences that operate in the production of epidemic or endemic disease, and have it in his power to suggest the remedy, where hygienic measures are imperfectly carried out. He will necessarily be much dependent upon the assistance rendered by the residents of his district, hence one of his functions will be to invite communications relating to the "sanitary wants of the district from the resident clergy, medical practitioners, registrars, relieving officers, and other persons or societies engaged in the visitation of

the poor." The less, however, he depends upon extraneous aid, the more efficiently will he carry out his duties, the more valuable will the reports be, the more certainly will he command that attention and respect which we desire that he should command. All the matters adverted to, and many others connected with the preservation of health and warding off of disease, will form the subjects of the reports the medical officer of health is required to make to the local board. These reports will necessarily involve interests of a very varied and important character: they will render circumspection and tact quite as imperative as high scientific attainments; for, as we have seen it stated somewhere, "property may be libelled as well as character."

The results that have been hitherto achieved in sanitary science have been mainly due to the self-sacrificing labours of individual medical men. But the proverbial apathy of ruling powers to all matters not immediately affecting place and emolument has received no apter illustration than is afforded by the history of disease, and the tardy acknowledgment of the relation of state medicine and the welfare of nations.

If the 'Minute' of the General Board of Health be acted upon, if the medical officers of health of the different districts in the metropolis fulfil the expectations that have been raised, we may date from the passing of Sir Benjamin Hall's act a new era for the medical profession; but that such a consummation may result, it is necessary that the members of the profession should be true to themselves and to one another. It is not for us to determine in how far the proceedings of the last few months may be conducive to their dignity or interests; but of one thing we are certain—that the due performance of the duties required of the medical officer of health in a large metropolitan district, is incompatible with the demands of private practice. This is well put in the 'Minute':

"Where possible, it will be well to debar him" (the medical officer of health) "from the private practice of his profession: first, because the claims of such practice would be constantly adverse to those of his public appointment, the duties of which (especially at times of epidemic disease, when his official capacity would be most needed) private practice could scarcely fail to interrupt and embarrass; secondly, because the personal relations of private practice might render it difficult for him to fulfil with impartiality his frequent functions of complainant; and thirdly, because, with a view to the cordial good-will and co-operation of his medical brethren, it is of paramount importance that the officer of health should not be their rival in practice, and that his opportunities of admonitory intercourse with sick families should not even be liable to abuse for the purposes of professional competition."

The inherent difficulties attending the fulfilment of the duties of the medical officer of health will be sufficient to render any complication with professional jealousies not only undesirable, but fatal to the office.

The 'Minute' very properly hints, that if such and such requirements are necessary; if we are to see men distinguished from their fellows by talents and acquirements, and, withal, possessed of the tact and moral independence that characterize a high-toned gentleman, the salary ought to be sufficient to enable the holder of the office to dispense with the income derivable from private practice. None of the salaries hitherto given or promised show that the vestries have formed a proper estimate of the importance of the office; and we see much reason to regret that the apparent willingness of medical men of every denomination to take the

appointment before the duties were defined or the salaries were fixed, should have tended to confirm the vestries in their opinion, that the market value of medical science must be low indeed when, under such circumstances, the competition is unlimited.

The individual member of a profession should never forget that he has duties to perform to his fraternity, almost as imperative as those to himself and his family; he should never dissever their interests in his mind, as they are indeed intimately interdependent. Other professions may possibly at times have carried this feeling too far—we have yet to arrive at that point of political development at which we regard our individual interests as bound up in the welfare of our common profession.

Such a view would find no advocacy with us did we not at the same time feel that we were advocating the real benefit of the community at large. But to obtain such men as the 'Minute' requires, or rather to retain them—for it is evident that some, if not all, districts will, in the first instance, have it in their power to appoint first-class men,—to retain such men, it will be necessary that the salary should be commensurate with the demands and usages of modern society.

The appointments will lead those who take them with the idea of prospective advantages, to sad disappointments. The office ought not to be an introduction to private practice; it cannot, with but solitary exceptions, lead to higher appointments; and of retiring pensions, even upon the paltry pittances now decreed, we hear nothing. Nay, the medical officer of health is entirely dependent for his tenure of office upon the caprice of the local vestries, a relation which is not likely to conduce to his freedom of action.

Still, we regard these appointments as a great step in modern civilization; they establish a most important principle—but that that principle be duly and permanently realized, it is right and proper that the men by whom this is to be done should be as unfettered as possible, and that they should receive that public recognition of their value which a vestry can express in no other form than by a large quarterly cheque. May we hope that an ample discussion of the question at issue may be ultimately as conducive to the interests of the profession as we believe that the hundred and thirty-second clause of Sir Benjamin Hall's act will, if effectively administered, prove to the metropolis, and, eventually, by example, to the entire kingdom.

Review XI.

Medico-Chirurgical Transactions. Vol. XXXVIII. *London*, 1855. 8vo. pp. 352.

Although not so bulky as some of its predecessors, the present volume is second to none in point of intrinsic value. The following analysis will bear us out in the opinion that the Society which can contribute annually to the science of medicine and surgery such a body of pathological and therapeutic information as is herein presented, must ever maintain a most exalted position in the scientific world.

I. *The Fifth Series of Pathological Researches into the Diseases of the Ear.* By Joseph Toynbee, Esq., F.R.S.

The researches here recorded have been prosecuted by Mr. Toynbee during the last five years. Compared with the results of 915 dissections published in the thirty-second volume of the 'Transactions,' the author considers the later to have a higher value than the preceding, inasmuch as these made known only the morbid anatomy of the ear, while those open the field of pathology. This will be seen in the tabular statement of the morbid appearances found in 134 cases of diseased ears. Two or three passages must be quoted from this paper.

"In a paper laid before the Royal Society, I have endeavoured to demonstrate that the faucial orifice of the tube is always shut, except during the momentary act of swallowing, when the tensor and levator palati muscles open the tube, and allow mucus to escape from the tympanic cavity, or air to pass in or out. It must be apparent that a thickened condition of the mucous membrane covering the guttural orifice of the tube is liable to cause obstruction, by preventing the muscles from separating the margins of the orifice; and obstruction from this cause does, I believe, not unfrequently take place; at least I am induced to form this opinion from the careful examination of cases, and from the post-mortem inspection of the guttural portion of the tube in many dissections conducted subsequent to my former paper."

Mr. Toynbee had previously expressed a conviction that deafness seldom depends upon obstruction of the Eustachian tube. This candid avowal of a modification of his opinions is deserving of attention. Mr. Toynbee's enlarged knowledge, derived from so accurate an observation of the post-mortem appearances in diseases of the ear, has induced him to think that

"Some of the most common, and yet most important morbid conditions of the ear, had not previously been even suspected. Of these I will merely mention the presence of osseous and molluscous tumours in the external meatus, the various diseases of the dermoid layer of the membrana tympani, the ulceration of its fibrous laminæ, having among its singular results obliteration of the tympanic cavity; the existence of membranous bands connecting the ossicles to each other, to the membrana tympani, and to the walls of the tympanum; the various morbid states of the mucous membrane of the tympanum; and lastly, ankylosis of the stapes to the fenestra ovalis."

Mr. Toynbee further points out the confusion of cases that has prevailed under the names of otitis, otorrhœa, and caries of the petrous portion of the temporal bones. Tables are given of the results of 1523 dissections.

II. *Operation for Congenital Cataract on an Adult, followed by Division of the Recti Muscles, for the purpose of Controlling the Oscillation of the Globes.* By G. Critchett, Surgeon to the Royal London Ophthalmic Hospital.

The following is a short abstract of a history fully given by Mr. Critchett:—

Jane Smith, aged twenty-two, a tall well-formed young woman, with a pleasing, intelligent, and cheerful appearance and manner, was admitted into the Ophthalmic Hospital in the spring of 1849. There was slight internal strabismus of both eyes; considerable oscillation and involuntary rolling of the globes from side to side; the head was depressed, and the lids were usually kept nearly closed. The corneæ were bright and normal; the anterior chambers were rather large; the irides were bright, and of a deep brown colour, rather thin, and stretched towards the pupil, which was very small, rather irregular, and filled with a flat white substance, which had the appearance of being a dense piece of the capsule of the lens; the pupillary margin of both irides were firmly adherent to these capsules, and were, in consequence, quite unacted upon by the stimulus of light, or by belladonna. There was good perception of light, and under certain circumstances, when the light was very strong and thrown in a favourable way, a very bright colour could be distinguished from a dark one. At the ages of three, nine, and eleven years, she had been operated upon without benefit.

Having by the performance of several operations overcome the extreme firmness and toughness of the capsule, the strength of the adhesions between the capsule and iris, and the constant, irregular, oscillatory movements of the globes, Mr. Critchett considered that he had accomplished all that operative measures could secure. The poor girl had two fine dark hazel eyes, with small, clear, central pupils; and the globes were quiet, central, worked together, and under fair control. Still, vision was imperfect, owing probably to the absence of lenses, the partial development of the retina, and the entire want of education. With the aid of glasses she obtained a clear outline of objects, which appeared to her larger than her previous experience, derived through the sense of touch, had taught her. Her description of objects, their shape, colour, &c., proved that she saw them in their erect and natural position, and not inverted, as they appear upon the retina. She was very near-sighted, and everything seemed flat to her. Her greatest difficulty was with the human face. Within the last two years she has made great progress in the rapidity and certainty with which she can recognise objects. She can distinguish small objects, and find her way about; she has learnt her letters, but has not the opportunity of further education.

To this history the author appends a few practical remarks upon the condition of the eye itself, and the operations that were had recourse to in this case.

III. *Inguinal Tumour associated with Symptoms of Strangulated Hernia, and Absence of the Testicle on the affected Side.* By Henry Thompson, F.R.C.S., M.B.

The case here related forms, with its attendant commentary, a valuable contribution to the surgery of hernia.

IV. *On the Juvantia and Lædentia in Diabetes.* By John M. Camplin, F.L.S., &c.

Over and above its autobiographic interest, the chief practical point of this contribution is to be found in its commendation of bran-bread as an article of diet in cases of diabetes.

V. *On a Plastic Operation for the Restoration of the Lower Lip.* By Thomas T. Teale, Surgeon to the Leeds General Infirmary.

"Of the evils resulting from the contraction of scars, few," observes Mr. Teale, "are more serious, either in the distress or the disfigurement they occasion, than the eversion and dragging downwards of the lower lip following burns of the neck." For the relief of this deformity, Mr. Teale has adopted a mode of operating, which he describes in this paper. This operation consists in the formation of two lateral flaps from the everted lip and neighbouring portions of the cheeks, and in uniting them in the median line above the central portion of the base of the everted lip; or, in other words, in building up a new lip upon the base of the old one. The operation is rendered more intelligible by woodcuts. Three cases are related by Mr. Teale.

VI. *On Dislocation of the Femur upwards and forwards beneath the Crural Arch.* By W. Cadge, F.R.C.S.

Mr. Cadge has enjoyed the opportunity of a post-mortem examination of a case of this injury, in a case which was described by Mr. Travers, Jun., in the twentieth volume of the Society's 'Transactions.' The bones have been removed and preserved by Mr. Cadge. A full description of the changes found on dissection is given, together with a drawing of the new acetabulum, and its relation to the old acetabulum, the spinous processes, &c.

Among the practical remarks which accompany this pathological contribution, is the question of the period beyond which reduction in such a dislocation ought not to be attempted. This cannot be solved, observes the author, by the application of any rule based on the lapse of time only. The age and condition of the patient must in each case guide the decision. Sir Astley Cooper's limit of eight weeks, Mr. Cadge thinks too restricted.

VII. *On Bony Ankylosis between the Humerus and Scapula, after Disease.* By Holmes Coote, F.R.C.S.

Mr. Coote states that he has searched the Museum of the Royal College of Surgeons of England, and the collections attached to most of the metropolitan schools of medicine, in vain; and has been equally unsuccessful in his inquiries among his personal friends; not having been able to meet with another example of this termination of inflammatory morbid changes, besides the specimen he exhibited to the Society. The specimen in question came from the dissecting-room of St. Bartholomew's Hospital, having been taken from the body of a man aged thirty, who used to obtain his living by performing as a juggler and tumbler in the public streets. Mr. Coote thus describes this specimen:

"The humerus and scapula, both somewhat smaller than natural, are completely fused by ankylosis. The sawn surface shows that, but for a line indicating the junction of the epiphysis with the shaft, the general cancellous texture of the former would be continuous with that of the latter. As it is, no line of demarcation exists between the glenoid cavity and the altered head of the bone. A small cavity, capable of holding a pea, seen in the detached fragment of the specimen, was filled by a substance, thicker, more yellow and opaque, than the oily fluid permeating the rest of the bone; I believe this to have been the seat of a small abscess, which, having formed, ceased to extend, and the contents gradually acquired a consistence which has not uncommonly led to the mistake of their being considered tuberculous. It appears to me that, first, the head of the bone has been changed in form by ulceration; and that, secondly, the disease having come to an end, osseous union has taken place by fusion of the opposed granulating surfaces of humerus and scapula, and by a limited deposit of new bony matter."

The humerus was in this case dislocated upwards; the whole results, Mr. Coote supposes, were produced by rheumatic inflammation.

Mr. Coote refers to a nearly similar specimen in the Museum of St. Bartholomew's Hospital, and to two apparently parallel preparations in the catalogues of the Musée Dupuytren, and of the Richmond Hospital Museum, Dublin.

Mr. Coote draws the practical inference, that the possibility of bony ankylosis in cases of diseased shoulder-joint, is not sufficiently considered when the question of resection of the head of the humerus is raised.

VIII. *On the Relations of the Mortality from Cholera in London to the General Mortality and Temperature.* By Edward Smith, M.D., LL.B. Lond.

"This communication has been prepared with a view to prove that there are certain meteorological conditions related to cholera which have not hitherto been noticed; and which, although they do not suffice to account for the outbreak of that scourge, give information which may assist us in our investigation as to its nature and origin. It is limited to a consideration of the two epidemics in London of 1849 and 1854; and since the former has already received much attention at the hands of the most competent authorities, it will be alluded to here only as offering points of comparison and contrast with that of 1854."

Two charts or diagrams are given to show the above-mentioned relations of cholera. The accompanying observations by Dr. Smith are too condensed to admit of their being transferred to our pages. We may, however, give the following general conclusions which are found on Dr. Smith's chart, No. 1.

"At the *period of the year* when *cholera prevails:*

"1. *The temperature* has progressively increased for months, and has attained its acme, so that the ground, water, and air are hotter than at any other period of the year.

"As it declines, so does cholera.

"2. The *daily variation* is very changeable, but is the highest in the week when the cholera was the highest, both in 1849 and 1854.

"3. The *dryness of the air* has long been very considerable; and then, although great, is beginning to decline.

"4. *The rains* do not prevail, so that the ground is dry, the rivers low, the beds of stagnant waters exposed, the drains unflushed, and emitting foul air.

"5. *The winds* are light and south-westerly, so that the temperature is maintained, and exhalations not removed.

"6. *The electricity* is collected in the air.

"All these circumstances have a tendency to exhaust or to oppress animal and vegetable vitality. All have *greater influence in hot climates, and in low and enclosed situations*, where exhalations abound, and cannot be removed."

IX. *On a Successful Method of Treating Acute Rheumatism by large and frequent Doses of Bicarbonate of Potash.* By Alfred Baring Garrod, M.D.

Considering that Dr. Garrod is the author of a work on Materia Medica, we are not a little surprised at his announcement of a *novel* treatment of acute rheumatism by bicarbonate of potash. Dr. Wright, of Birmingham, in the year 1849 or 1850, published the result of his observation of the benefits derived from alkaline baths. Dr. Fuller, in 1852, published a treatise upon rheumatism, in which he still further enforced the efficacy of alkaline medicines, and showed the chemico-pathological principles upon which the treatment is based, as well as their influence in diminishing the tendency to fibrinous deposits from the blood. Dr. Garrod's paper does not contain any additional information beyond what the profession was already in possession of from the above-mentioned sources. Dr. Garrod states that his cases date from May, 1852; Dr. Fuller's first case is dated August, 1845. Dr. Garrod's conclusions do no more than confirm the statements made by Dr. Fuller, as to the *modus operandi* of alkalies, and of their effects upon the heart, and upon the various excretions.*

X. *Cases of Phlebitis, with Pneumonia and Pleurisy, from Chronic Disease of the Ear.* By W. W. Gull, M.D.

Three cases are here related, in neither of which—

"Had the cerebrum or cerebellum become the seat of disease; but the caries of the mastoid cells had set up local phlebitis, extending down the jugular vein, and producing an affection of the lung, which was in all the immediate cause of the fatal termination."

XI. *Notes on Lithotrity.* By Sir Benj. C. Brodie, Bart.

This paper has been noticed in this journal, January, 1856.

XII. *Observations respecting Degeneration of the Pancreas.* By C. Handfield Jones, M.B. Cantab., F.R.S.

Thirty cases are here recorded, in which Dr. Handfield Jones carefully examined the pancreas; the results he has obtained constitute a pathological contribution of great value, the diseases of the pancreas being but obscurely known. In a tabular form, the author has given briefly the history of the illness in each case, and the post-mortem examination, including the state of the stomach, duodenum, and pancreas.

The changes observed in the pancreas have been microscopically examined.

Degeneration of such a kind as might be termed fatty, is the most striking morbid change met with by Dr. Jones:

* It is right to observe that while Dr. Garrod especially recommends the employment of bicarbonate of potash in two-scruple doses, Dr. Fuller appears to give the preference to the neutral salts of soda.—Ed.

"The following details of the examination of case 17 in the table will convey a good idea of the condition of the gland in an advanced stage of this form of wasting (which is further illustrated by a lithograph). The glandular vesicles or ultimate cavities are entirely destroyed—no trace of limitary membrane is to be seen; the whole tissue is reduced to a coarsely-lobulated mass, which contains a large quantity of oily matter. The epithelium consists of mere shadowy traces of nuclei, with the smallest amount of faint, dim, amorphous matter, containing much oil in a finely divided state. The nuclei do not show a well-marked contour, like normal ones; nor have they the refracting contents, nor nucleoli. Sometimes, as stated by Dr. Salter, there are absolutely no nuclei or cells—nothing but amorphous and oily matter. A gland thus degenerated is of a dirty-yellowish colour, soft, lax, and flabby; and often exhibits some white spots upon its surface, which consist of groups of fat-cells. Similar groups are also present in the interior of the gland, but it is very clear that the wasting process is quite independent of their formation."

Dr. Jones describes earlier stages of this change, as well as another morbid condition, consisting in an excessive accumulation of the epithelial contents of the ultimate cavities.

Pancreatic degeneration, so far as the statistics adduced by Dr. Jones can supply data, appears rather to affect middle life. Sex does not seem to have much influence in its causation; neither is it shown that any special morbid condition is associated therewith beyond indications of impaired vital power. No correlation could be discovered between degeneration of the pancreas and disease of the stomach or duodenum. No symptoms, Dr. Jones states, give any intimation of the existence of even the most advanced pancreatic degeneration.

XIII. *Sequel of a Case of Extirpation of the Uterus.* By John Windsor, Esq.

On the 22nd of June, 1819, a paper by Mr. Windsor was communicated to the Society by Sir A. Cooper, on the subject of inversion of the uterus, with a case of successful extirpation of that organ. It was published in the tenth volume of the 'Transactions.' Mr. Windsor now gives the sequel up to the period of the patient's death, on October 27th, 1854, she having survived the operation thirty-six years. Her death was occasioned by severe injury to the brain from an accident in travelling between Leeds and Bradford.

Mr. Windsor has no note of this case between November, 1819, when she was "in an excellent state of health," and September, 1840, when she was fifty-three years of age, and had married again. Having left Manchester, she subsequently fell under the care of Mr. Teale, of Leeds, who reports that he is informed that, in 1840, at Bradford, she had strangulated femoral hernia, which was allowed to pursue its course without any surgical treatment. In eight days, the hernia and its coverings sloughed; fæces were discharged from the wound; and in six weeks the abnormal anus spontaneously closed.

In December, 1850, January, 1851, and in 1853, she was operated upon for strangulated right femoral hernia.

The pelvic organs were removed by Mr. Teale, and transmitted to Mr. Windsor. The os uteri is apparently in its normal state: it is about half an inch in width; a probe passed through it into the blind or closed cavity

beyond, does not penetrate more than three-eighths of an inch. This is all that remains of the truncated cervix. The communication with the abdomen seems to have closed well "by a membranous or fleshy surface, on which a portion apparently of one Fallopian tube with its fimbriated extremity can be traced, and near it is an appearance of an atrophied ovarium." The ovary and Fallopian tube of the opposite side terminated in a similar manner in connexion with the cervix uteri.

XIV. *Cases of Disease of the Larynx, and some Observations on the Operation of Tracheotomy.* By T. A. Barker, M.D.

These cases are related with a view to enforcing the practice of operating much earlier than is usual—that is, before the accession of those urgent symptoms which leave no alternative except the immediate performance of the operation and speedy death. They certainly bear out the conclusion, and therefore, if for this reason only, should be carefully perused. They do not admit of abridgment.

XV. *Researches on Gout.* By William Budd, M.D.

Two principal points are noticeable in this paper by Dr. Budd: one, the detection of urate of soda as an interstitial deposit in the cartilages of gouty patients. The form, size, and general appearance of these dots of deposit bear a certain resemblance to the minute nodules of oolite. The cartilage cell is the focus of each individual deposit—the original centre within and around which the crystallization occurs. The evidence of this is gathered from the form, size, and grouping of the deposits; from the effects of re-agents; and from the occurrence of groups of crystals in the very early stage in which the relation between the cell and the crystalline matter is plain to the eye. This relation is soon superseded by common physical influences, the crystals radiating from the cell to the whole central mass.

The second series of researches traces those changes which the morbid matter undergoes, and the detection of their products in the blood. In 11 cases, the analysis is stated to have been performed with the result of the detection of urea, and other crystallizable matters resembling oxalate of lime, benzoic acid, &c., and probably hippuric acid, in the blood. Our analysis of this interesting paper is necessarily brief—the original, in fact, scarcely admitting of condensation. We should add, that the appearances described are illustrated by lithographs.

XVI. *Account of a Growth of Cartilage in a Testicle and its Lymphatics, and in other Parts.* By James Paget, F.R.S.

This is a very extraordinary instance of the formation of cartilage in the parts above mentioned, as well as in the lungs, pulmonary artery, and vena cava inferior. The preparation of the testicle and other parts are to be seen in the museum of St. Bartholomew's Hospital. Mr. Paget has here given a minute description of these, accompanied with five lithographs, one of which is coloured. We should only mislead our readers were we

to attempt an abridgment of this unique history; at the same time that we should do injustice to Mr. Paget's pathological comments, which deserve undivided attention.

XVII. *Cases illustrating the Pathology of Mania and Dementia.* By Alex. John Sutherland, M.D.

The object of this paper is to show what light may be thrown upon the pathology of insanity by analysis of the mixed phosphates in the urine. The chemical analyses were made by Dr. Beale, of King's College. The following are the chief points in Dr. Sutherland's "conclusions." Phosphates exist in excess in the urine, in paroxysms of acute mania. They form a minus quantity in the stage of exhaustion and in the third stage of general paralysis. The quantities of phosphates in the urine correspond with the proportion of phosphorus in the brain. The plus quantity of phosphates in the urine denote the expenditure of nervous force, and is not a proof of the existence of acute inflammation.

XVIII. *Supplement to a Paper on the Use of the Speculum in the Diagnosis and Treatment of Uterine Diseases.* By Robert Lee, M.D., F.R.S.

The paper to which the present is referred as a supplement was published in the thirty-third volume of the Society's 'Transactions.' Two hundred and seventeen additional cases have been brought under Dr. Lee's notice during the short period of five years that have since elapsed!

A more painful and humiliating picture of uterine pathology could not have been drawn than is exhibited in this table of instances of erroneous diagnosis and practical maltreatment. The paper should have been entitled, 'On the *Mis*use of the Speculum;' a misuse, moreover, not ending simply in difference of opinion, or of treatment, but leading to demoralization, increase of physical suffering, and too often to a fatal termination. Surely the publication of such facts should cause practitioners to hesitate in the adoption of measures which result in such lamentable consequences.

PART SECOND.

Bibliographical Record.

ART. I.—*Cretins and Cretinism.* A Prize Thesis of the University of Edinburgh. By GEORGE S. BLACKIE, M.D., Curator of the Botanical Society of Edinburgh.—*Edinburgh*, 1855. pp. 70.

MANY of our readers are doubtless familiar with the noble efforts made by Dr. Guggenbühl to restore to the ranks of humanity the Cretin who, until recently, was considered a *lusus naturæ*, and an irreclaimable outcast from human society. In a letter to Lord Ashley, which Dr. Guggenbühl published several years ago, he showed that it was erroneous to suppose the Cretin to exist solely in the valleys of the Alps; he brought the subject home to us by demonstrating the existence of this fearful condition among ourselves, in localities where causes were found to operate similar to those prevailing in the Swiss valleys. Thus, Dr. Guggenbühl met with numerous cases of well-marked cretinism in Settle and Silserdale, in Lancashire. He found them even more numerous in the West of England,

"Where similar predisposing causes exist as on the Continent The village of Chiselborough, in Somersetshire," we are quoting from Dr. Guggenbühl, "lies in a narrow valley enclosed on three sides by high hills, and is very badly ventilated in consequence. The majority of the 350 inhabitants are affected with goître, hard hearing, indistinct articulation, and hebetude; in twenty-four of the inhabitants these characters are so developed as to constitute confirmed cretinism."

In the well-written monograph of which Dr. Blackie is the author, we find corroborative proof of Dr. Guggenbühl's observations in England, for he shows that—

"In the highlands of Scotland and Wales, and in the mountainous parts of the south of Scotland, in such enclosed valleys, we almost invariably find idiots; in most of our valleys the other conditions mentioned as causing cretinism do not exist, such as lime formations, snow water, indolence, and excessive heat; but we have the shut-up valley, the drunkenness, the bad nourishment, the intermarriage of relations, just as in the Swiss and German mountains. And what are these deformed idiots? To all intents and purposes they are cretins, which, according to the definition given above, are beings possessed of deformed bodies and fatuous minds, incapable of performing any mental, and more than a very limited proportion of physical offices, if any."

While it is melancholy to find that extended investigation lays bare greater social and physical vices, it is satisfactory to know that increased exertions are made in London, in Edinburgh, and elsewhere, to carry out

those curative indications which Dr. Guggenbühl has been the first to point out.

Dr. Blackie's essay deserves the special attention of all interested in the study of the human mind, and its relation to physical training and development. It forms an excellent summary of what is known on the subject of cretinism, and is replete with wise and suggestive remarks.

Art. II.—*Surgical and Pathological Observations.* By Edwin Canton, F.R.C.S., Assistant-Surgeon to Charing Cross Hospital; Lecturer on Surgical Anatomy, &c.—*London*, 1855. 8vo, pp. 106.

The materials of which this volume is composed have already appeared, at various periods, as contributions to two of the weekly medical journals; but the author states that he has endeavoured to amplify, amend, and illustrate his observations, in thus submitting them to the profession in a collective form. The subjects treated of are—chronic rheumatic arthritis; shortening of the leg from bruise of the hip; the employment of purgative medicine after the operation for hernia; the occurrence of cysticercus cellulosæ in the sub-conjunctival areolar tissue, and within the human eyeball; congenital deficiency of the gall bladder; dislocations of the astragalus; a rare form of aneurism.

The subject of chronic rheumatic arthritis is considered especially in relation to its morbid anatomy. This singular and intractable malady has for some years past engaged the attention of medical inquirers.

"It invades the small and large articulations: equally may it affect those of the fingers and toes, or of the knee and hip, inducing in them the most unsightly deformity, and permanently impairing their functions, so that the power of prehension is lessened or lost, and locomotion is perverted or prevented. The joints of the lower jaw may experience an attack, when discordance of speech ensues and mastication of food becomes difficult. The spinal column may suffer, and the body be irremediably contorted, whilst internal organs are thereby secondarily, and often seriously, affected. Exostoses (osteophytes) very characteristically spring forth from near the joint-surfaces of the bones; cartilaginous productions may lie, in large numbers, freely in the articulation, or project pedunculated within it, associated with groups of vascular, synovial fimbriæ; the encrusting cartilages become absorbed, and the exposed bone is hardened and eburnated; the fibrous structures around are in part removed, and in part encroached upon by ossific deposits, which must in their progress of formation press injuriously upon the nervous filaments in their vicinity, and thus superadd continued irritation as they are producing insuperable disfigurement and impeding freedom of motion. The muscles in the neighbourhood become powerless, as atrophy and degeneration implicate them." (p. 2.)

The symptoms are fully described. Under the head of Morbid Changes the author observes:

"Shortening of the cervix femoris is very characteristic of chronic rheumatic arthritis, and especially so is the horizontal position it assumes, or the still greater depression it suffers, whereby a direction shall be given exactly the reverse of its natural one. The lower limb is shortened in proportion as the one or other of these conditions obtains and the foot becomes more or less everted." (p. 7.)

This memoir is illustrated by several well-executed wood engravings. In the following paper the author points attention to the fact, that inter-

stitial absorption may supervene upon bruise of the hip. He is opposed to the employment of purgative medicines after the operation for hernia; maintaining, that if adequate time be allowed, such medicines withheld, and a soothing plan adopted, nature will perfect the cure. On this vexed point of surgical practice we conceive the judicious practitioner will always be guided by circumstances, and act accordingly. In reference to the occurrence of cysticercus within the eye, of which six cases are on record, the author concurs with Dr. Mackenzie as to the propriety of early removal of the hydatid, in order that no permanent mischief may be produced by its presence.

In treating of dislocations of the astragalus, the author gives minute details of the dissection of an unusual form of luxation of that bone—namely, that of the body partially inwards with the tibia, the astragalo-scaphoid articulation remaining perfect. The rare form of aneurism which he describes was situate in the substance of the sartorius muscle, and occasioned considerable difficulty with respect to diagnosis. He is of opinion that this peculiar form of aneurismal disease is most likely to be produced, as in the instance detailed, in situations where a muscle, in overhanging a large artery, receives a branch directly from it.

In concluding this brief notice, we would simply remark, that the observations contained in this volume are on the whole creditable to its author.

ART. III.—*Om Dødeligheden i Norge, Bidrag til Kundskab om Folkets Kaar.* Af EILERT SUNDT, Cand. Theol.—*Christiana*, 1855.

On the Mortality in Norway; a Contribution to the Knowledge of the Condition of its People. By EILERT SUNDT, Candidate in Theology. With numerous Tables.—8vo, pp. 206.

ISSUING from the pen of a clergyman, the volume before us naturally has a clerical character. The introductory and closing portions of Herr Sundt's volume are written in a tone of serious piety well suited to the gravity of the important subject of which it treats, embracing the consideration of the uncertainty of human life in individual cases, and of the great change which, sooner or later, awaits us all. The bulk of the work is necessarily statistical, and as the field of observation, the population of Norway, is not very extensive, we shall quote but briefly from the author's pages, and shall chiefly point out the portions in which the results obtained are compared with those derived from similar investigations in other countries, as being the parts of the book most likely to interest the English reader.

From a Danish table published in 1845, to which the author appends the numbers for Norway, the value of life would appear to be high in the latter country. Thus the mortality is quoted as being, in certain years, for Iceland, 1 in 30; Saxony, 1 in 32; European Russia, 1 in 32; the Austrian Empire, 1 in 33; Sardinia and Prussia, each, 1 in 35; Bavaria, 1 in 36; the Netherlands, 1 in 39; Belgium, 1 in 40; France, 1 in 42; Hanover, 1 in 43; Sweden, 1 in 44; Great Britain and Ireland (1838—42), 1 in 45; in Denmark, 1 in 47 (including stillborn children);

in the Danish Duchies, 1 in 49 (exclusive of the stillborn); in Norway (1826—45), 1 in 61·9 (exclusive of the stillborn), and including the stillborn, for the same period, 1 in 49·05. The author obtains the mortality by dividing the mean of the number of the population, at the commencement and close of each decennial period, by the annual average of the number of deaths which have occurred during the ten years.

In a subsequent chapter the author compares the values of the mean term of life at various ages for each of the only four countries in reference to which, he states, the materials for such a comparison exist—namely, England and Wales, Denmark, Sweden (with Finland), and Norway; four countries of Northern Europe which, for the most part, are inhabited by two great divisions of the Germanic race—the Anglo-Saxons and the Scandinavians. Here, again, Norway has the advantage at all ages; Denmark has the advantage over England up to thirty years of age for the male sex, and up to fifty for the female: after these ages the value of life would appear to be greater in England than in Denmark. The numbers for Sweden are not introduced into the comparative table, as they are derived from a more distant period (1801—5). A comparison of the results obtained for the whole population of Norway with those collected in the country districts of Denmark and in the Surrey district in England, proves that the advantage possessed by Norway is not solely owing to the fact that its rural population bears a larger proportion to that of the towns than is the case in Denmark. and still more in England. From a comparison of three decennial periods, into which the author has divided the years 1821 to 1850, it appears, contrary to what might have been expected, that the mortality in the second of these periods was considerably greater than that in the first, and that the result in the third was not quite so favourable as in the first. The author discusses at considerable length the probable causes of this circumstance, but does not seem to have arrived at any very satisfactory solution of the fact.

The next four sections are devoted to a review of the comparative mortality in the several dioceses and deaneries of Norway; but as this subject can possess little more than a local interest, we shall not enter upon it.

The number of violent and accidental deaths—as by lightning, snow slips, the capsizing of boats, exposure to the fumes of charcoal, &c.—is very large, amounting, on an average of ten years, to 945·8 out of 24,065·4, the average annual mortality, and is in fact much higher than in other countries. Thus, the author states that the yearly number of accidental deaths is, for each million of the population, in France (1846), 212; in Denmark (1845—49), 393; in Sweden (1841—50), 625; in England (1840), 627; and in Norway (1841—50), 712. It would hence appear, that while the total mortality is less in Norway than in the other countries here mentioned, violent or accidental deaths are much more frequent. That this is owing to the natural circumstances of the country is shown by the fact that, during the ten years 1836—1845, of 901, the yearly average of violent or accidental deaths, 682 were caused by drowning; and that in the diocese of Christiana, which is mostly inland, the average annual number of accidental deaths was only 45 for 100,000 of the population; while in Tromso, which is almost exclusively a moun-

tainous sea coast, the proportion was 224 in 100,000. The author makes this fearful proportion of violent deaths still more apparent by some striking illustrations.

The author gives the following as the yearly number of suicides for 100,000 of the population in each of the countries mentioned:—Ireland (1831—41), 1; Lombardy, 1·7; England (1840), 5·7; Sweden, 6·7; France (1835—43), 7·9; Prussia, 10·2; Norway, 10·8; Denmark, 23·1.

Before concluding this brief notice, it may be well to mention the sources of information open, in Norway, to the author in his investigations: these were the lists of mortality which the clergymen have been, since the year 1735, obliged to send in yearly to the dean or bishop, and which the latter in their turn must collate, each for his own deanery or bishopric, according to a scheme which, especially for the last thirty years or more, has been very complete; and the equally perfect decennial censuses which have been taken during the same thirty years. Of these materials Herr Sundt has well availed himself; his book is elaborately and carefully compiled, and will be found by those who are acquainted with the Norwegian language, and may be interested in the investigation of the condition of the people, to contain a large amount of accurate information, conveyed in a style which is both appropriate to the subject, and is suggestive of serious reflection.

ART. IV.—*Diseases of the Rectum.* By RICHARD QUAIN, F.R.S., Professor of Clinical Surgery in University College Hospital. Second Edition.—*London*, 1855. pp. 332.

THIS treatise is founded upon a series of clinical lectures upon the diseases of the rectum. It will not be saying too much of it, that it presents, what we should regard as, a model of excellence in clinical lectures. A few cases are concisely and graphically related, illustrating the several forms of disease, and presenting distinct pictures thereof. These are followed by clear, apt. and condensed comments, setting forth the structure of the diseased parts, and the best practice in each instance. The practical directions are not given merely at second-hand, as expressing routine practice; they lay down several very important deviations from, and improvements upon, the ordinary modes of proceeding. More particularly are these features observable with regard to the treatment of painful ulcers and spasm of the rectum. The volume constitutes a highly valuable guide either for student or practitioner.

ART. V.—*Headaches; their Causes and their Cure.* By HENRY G. WRIGHT, M.D., M.R.C.S.L., Fellow of the Royal Medico-Chirurgical Society, Physician to the St. Pancras Royal Dispensary.—*London*, 1856. pp. 152.

THE careful examination of an important and prevailing affection, even though in itself necessarily symptomatic of deeper-seated derangements, cannot fail to prove serviceable to science, and thus beneficial to the sufferer. It is very proper that we should investigate and try to ascer-

tain the exact meaning of pain, whether affecting one organ or another, just as we seek to read in the abnormal conditions of a secretion, the indications of the derangements affecting the viscus from which it is derived. But in a monograph supposed to be written for the professional reader, it is surely right to expect that the author should seek either to establish new points, or to place well-known facts in a new light, and that regard should be had for what others have previously done in the same field. Throughout Dr. Wright's book, we find scarcely a reference to writers who have turned their special attention to the subject, or to such more comprehensive works, as those of Abercrombie, Graves, Romberg, or Todd, in which the student may learn the variety of bearings under which this symptom manifests itself. We have looked in vain for any new illustration in the domain of pathology or therapeutics; and regret to observe, that the book bears all the characters of being addressed rather to the patient than to the professional reader.

We should not be induced to pass our strictures upon the book in question, were it not that, from indications scattered here and there, we incline to think that Dr. Wright is capable of better things; and that if he will avoid the *ad captandum* style, he may produce a contribution to medical literature, to which we may be enabled to point in terms more agreeable to ourselves and more flattering to the author.

ART. VI.—*Statistics of Grave-Yards in Scotland.* By JOHN WEBSTER, M.D., F.R.S., F.R.C.P., Physician to the Scottish Hospital.

WE read of Old Mortality clearing the moss from the monuments of the Covenanters with his chisel, "trimming, as it were, the beacon-light which was to warn future generations to defend their religion even unto blood." Such are not the objects which now lead the philosopher into the grave-yards; he seeks life in death, and desires to pick out of the tombstones a lesson of humanity and physiology, which may teach present and future generations how to prolong their sojourn in this world. In this sense, Dr. Webster has been gleaning some curious and interesting information from the grave-yards of Edinburgh, Greenock, Stirling, Perth, St. Andrew's, Dundee, Arbroath, Forfar, Brechin, Montrose, Aberdeen, Tealing, Inverarity, Aberlemno, St. Vigians, Lochlee, and Edzell. Among the curiosities adverted to by Dr. Webster, are the instances of longevity which he has found recorded. Edinburgh is not remarkable for the high age attained by its inhabitants; yet the Canongate bellman, William Edie, who died in 1731, attained his 120th year. No such instance is to be found in Glasgow, where 44·50 per cent. of the population die before they are five years old, and 84 in every 100 persons born never pass their sixtieth year. St. Andrew's, again, is distinguished by its salubrity, and boasts also of having had an inhabitant who attained the age of 185.

With regard to the occurrence of longevity in towns and country districts, Dr. Webster makes the following practical remarks:

"According to the statements previously detailed, it appears that old people were more numerous in town districts than most persons would have supposed.

Unquestionably, many of the oldest persons recorded on gravestones died in populous towns; but a large proportion of these individuals had migrated from the country in early or in middle life, some towards the evening of their days. Glasgow is an instructive example of this; since, in this city, as I was informed on very good authority, several patriarchal individuals, buried in its cemeteries, were strangers. That towns are inimical to infantile life, there cannot exist any question; seeing that the records of all densely populated localities prove the correctness of such an opinion. Nevertheless, many towns possess advantages as residences for old people. There is more warmth in houses so situated. The congregation of so much animal life exerts a beneficial influence upon weakened and decaying constitutions. Association with younger fellow-creatures proves often advantageous to older physical frames. Besides this, aged persons, placed under the above circumstances, are more likely to receive kindness and attention from friends, and will be less likely to experience neglect, than in out-of-the-way rural places; while the benevolent hand of charity is more freely extended. But, whatever may be the influences, very old people generally live and die in towns." (pp. 18, 19.)

The bearing of hygienic conditions upon the duration of life, receives some apt illustrations in this visit to the Scotch graveyards, as in the case of Glasgow and Aberdeen.

"At Glasgow, old people are comparatively rare: in Aberdeen the contrary obtains; yet both are large manufacturing towns, situated on navigable rivers, and having each much shipping. Both are near the sea; and in many particulars they bear a marked resemblance. Aberdeen, however, lies on the east coast of Scotland; Glasgow near the western. Aberdeen possesses a dry granitic foundation, sloping towards the adjacent river; is abundantly supplied with excellent water; has a hardy, not mongrel, race of inhabitants; streets wide, well ventilated, and straight; an atmosphere little deteriorated by thick smoke or chemical impurities; weather which, though cold and often stormy in winter, is often good at particular seasons; and lastly, but not leastly, a degree of longevity which even appears to be hereditary. Here, therefore, varied circumstances exert considerable influence on public health and human existence, tending to support the physical powers, the *vis vitæ*, and to ensure longevity. In Glasgow, on the other hand, we have exemplified the simple reverse of the above description, thus affording, *pro tanto*, an explanation of the contrast I have noticed." (p. 19.)

We have arrived at a great epoch for London graveyards; they will soon belong to the things that have passed away. They have been the text of many a sermon, and of not a few lectures and addresses, and yet we conceive that there is still much unread on their stone tables; much that would repay the student, with reference to the habits and customs of past generations; much that, if examined with the spirit that has prompted Dr. Webster, might become profitable to present and future denizens of the metropolis.

Art. VII.—*Medical Notes and Reflections.* By Sir Henry Holland, Bart., M.D., F.R.S., &c., &c., Fellow of the Royal College of Physicians, Physician in Ordinary to the Queen, and Physician in Ordinary to His Royal Highness Prince Albert. Third Edition.—*London.* pp. 638.

We have a particular pleasure in again recommending to our professional brethren the work of which a third edition, more strongly than we are able to urge, proves the hold which Sir Henry Holland has already acquired

among his contemporaries. The constant references to be met with to his views in the works of esteemed authors, is the best testimony to their value. The 'Medical Notes and Reflections' have already taken their place among the standard works on medical subjects. We venture to prophesy that, as a comprehensive survey of the present and most enlightened views on a large range of medical topics, and as a model of elegant and convincing medical writing, the work will enjoy a reputation which will survive more than the generation to which it was first addressed.

ART. VIII.—*Hooper's Physician's Vade-Mecum; or, a Manual of the Principles and Practice of Physic.* Fifth Edition, considerably enlarged and improved; with an Outline of General Pathology and Therapeutics. By WILLIAM AUGUSTUS GUY, M.B. Cantab., Fellow of the College of Physicians; Professor of Forensic Medicine, King's College, London; Physician to King's College Hospital, &c., &c.—*London*, 1856. pp. 676.

HOOPER'S 'Physician's Vade-Mecum' is gradually undergoing so complete "a metamorphosis of tissue," that one or two more editions will leave scarce a vestige of the original. The editor thus undoubtedly acts up to the spirit of the author, who, in leaving his legacy, would certainly have desired no better immortality than that which appears secured to him by the constant alterations and additions rendered imperative by the demands of our advances in science.

It is our pleasant duty to call the attention especially of the student and the junior practitioner to this valuable manual in its present enlarged form, and to wish it that continued success which the labour bestowed upon its revision fully merits.

ART. IX.—*A Dictionary of Practical Medicine.* Part XVII.; being Part VIII. of Vol. III. By JAMES COPLAND, M.D., F.R.S., Fellow of the Royal College of Physicians; Honorary Member of the Royal Academy of Sciences of Sweden, of the American Philosophical Society, and of the Royal Academy of Medicine of Belgium; lately President of the Medical and Chirurgical Society of London; formerly Consulting Physician to Queen Charlotte's Lying-in Hospital; and Senior Physician to the South London Dispensary; Consulting, and lately Senior, Physician to the Royal Infirmary for Diseases of Children, &c.

IT is now exactly twelve years since one of our predecessors* gave that award of praise which was most justly due to Dr. Copland, on the completion of the first two volumes of his Dictionary. We received the seventeenth Part at the close of the past year; and as it concludes with Tubercular Consumption, we may now look forward to the possibility of the work being entirely achieved.

While we would wish to congratulate Dr. Copland on the approach of the termination of a task which has associated his name with the most eminent cultivators of science of the present age, we cannot but give

* The British and Foreign Medical Review, April, 1844, p. 503.

expression to a feeling of regret, that the termination should be so long delayed. All serial publications labour under the disadvantage of occasional unavoidable delays; but in most instances the material is somewhat prepared before the publication is commenced. We cannot doubt that this is the case with the 'Dictionary of Practical Medicine,' since we are informed by Dr. Copland himself, that he presents the results of labours accumulated since 1814. In justice to the present generation of students, and to early subscribers, of whom some are as fortunate as we ourselves, yet to survive; in justice to Dr. Copland himself, we trust that the accomplishment of the entire design may soon stand upon record.

ART. X.—1. *On Personal and Domestic Hygiène; showing the Value of Sanitary Laws: addressed especially to the Working Classes.* By LIONEL J. BEALE, Surgeon, &c.—*London*, 1855. pp. 23.

2. *Common Sense versus Homœopathy.* By SAMUEL KNAGGS, Member of the Royal College of Surgeons, London, &c.—*London*, 1855. pp. 48.

IF there be a means of circulating such pamphlets as the two of which the titles stand at the head of this notice, and the general public to whom they are addressed can be induced to read them, we most willingly lend our aid by expressing a hearty approval of their contents and style. Mr. Knaggs has put the questions at issue regarding homœopathy in a proper light, and handles his subject in a manner which we think a non-medical person, of ordinary education, must be able to follow and understand. Still, so long as the public, and more particularly the educated classes, are blindly ignorant of natural laws, they will regard all arguments and facts employed by the regular medical practitioner as *ex parte* statements. The only way by which their blind faith can be shaken is by familiarizing them with the laws of physiology. It is

"More light and fuller that they want."

In this sense, we are glad to promote the diffusion of books and pamphlets written like the one of which Mr. Beale is the author.

ART. XI.—*The Journal of Psychological Medicine and Mental Pathology.* Edited by FORBES WINSLOW, M.D., D.C.L. New Series. No. 1.—January, 1856.

AMONG the various departments of medical science, there is scarcely one of greater importance and more general interest, whether we regard it in a purely scientific point of view or in its social relations—domestic, political, or religious,—than that bearing upon the healthy and morbid state of the mind. Though the practice in the domain of mental pathology is necessarily a specialty, no enlightened physician can fail daily to be arrested by the observation of the intimate reciprocal influences of body and mind. To all medical men who take an enlarged view of their calling, the study of mental derangement must be one of surpassing interest; and to those whose duties do not permit extensive reading on the subject, we can very cordially recommend Dr. Winslow's journal. The first number of the new series contains articles of great value, to which we only regret not to be able to devote more than this cursory notice.

ART. XII.—1. *A Catechism of Chemical Philosophy; being a familiar Exposition of the Principles of Chemistry and Physics, in their application to the Arts and Comforts of Life.* Illustrated by One Hundred and Fifty Woodcuts. By JOHN HORSLEY.—*London*, 1856. pp. 247.

2. *The First Step in Chemistry.* A new method for teaching the Elements of the Science. By ROBERT GALLOWAY, F.C.S. Second Edition, with Illustrations on Wood.—*London*, 1856.

BOTH these elementary treatises may be recommended to the teacher and learner of chemistry. The first is arranged in the form of questions and answers, and very copiously illustrated; on which account, as well as on account of the simple explanations and systematic arrangement, it is likely to be a favourite. One illustration is particularly useful—viz., a coloured plan of the reactions produced by the ordinary tests of metals.

Mr. Galloway's volume, though less extensively illustrated, aims at a more scientific character, but offers a feature which must be of great use to the pupil or the tutor, in the shape of series of exercises, which are to be found at the end of each chapter.

ART. XIII.—*The Micrographic Dictionary; being a Guide to the Examination of Microscopic Objects.* Parts XVI. and XVII. By J. W. GRIFFITH, M.D., F.L.S., and ARTHUR HENFREY, F.R.S., F.L.S.—*London*, 1856.

WE have only to announce the completion of this work, on the excellence of the preceding numbers of which we have already expressed ourselves in terms of unqualified praise. It is in all respects such as to serve the purpose for which it is intended by its distinguished authors.

ART. XIV.—*Trees and their Nature; or, the Bud and its Attributes.* By ALEXANDER HARVEY, M.D., M.A., &c., &c.—*London*, 1856. pp. 236.

THE purpose of this agreeable little book is the discussion of a favourite theory. The author disclaims all pretensions to originality as regards the theory itself; there is, however, much that is new in the illustration. The indefinite longevity of many forest trees had seemed to him at a former period an exception to the general law of the determinate duration of all living organisms. In the endeavour to reconcile this apparent incongruity, the author had arrived at the conclusion which is in accordance with the teaching of every physiologist of the present day, that the tree is not to be considered as a "single or individual plant," but rather as "a congregation of individual plants of the same species."

The letters, of which the book consists, are addressed to his children, to whom it seems rather his object to communicate his own love of nature, than to give direct instruction. As a book for the young we cordially recommend it. It is likely to foster the habit of deriving pleasure from the observation of natural objects, and is moreover pervaded by a wholesome spirit of piety.

PART THIRD.

Original Communications.

Art. I.

On the Curative Processes in Chronic Pulmonary Tubercle, and the Local Conditions which Promote or Oppose them. By C. Radclyffe Hall, M.D., F.R.C.P.E., Physician to the Hospital for Consumption, and to the Institution for Ladies with Diseases of the Chest, Torquay.

(*Concluded from No.* 32, *p.* 485.)

Putting aside for the moment the constitutional part of the disease, there are several modes by which the local deposits in chronic phthisis may pursue a course not inconsistent with the life of the patient. The local cure of a pulmonary tubercle takes place—1, when the tubercle, being latent, permanently continues so, and does not progress; 2, when the tubercle undergoes without ulceration such transformation as renders it no longer a source of irritation; 3, when the tubercle, having led to ulceration, is ejected, and the ulcer afterwards heals in some way.

The cure without ulceration constitutes arrest: which thus includes both the case in which latent tubercle remains stationary—simple arrest; and that in which, after undergoing progressive changes, the tubercle attains a safe termination—arrest by transformation of the tubercles.

Simple Arrest.

Latent Tubercles.—The mere presence of abnormal deposits in the lungs, even to a very large extent, provided irritative inflammation be not set up, interferes surprisingly little with the general signs of health. It is quite compatible with ease and comfort in breathing, unless perhaps under extraordinary exertion, with a good amount of muscular vigour, and with a fair performance of general nutrition.

A mason, aged twenty-seven, was killed by the falling of a wall. On examination, the apices of both lungs were found stuffed with grey miliary tubercles. There was no inflammation around them. The man had been considered in good health, and free from cough or complaint.

It is, however, easier to prove the point by comparative pathology. For fifteen years past I have been in the habit of noticing the lungs in butchers' shops and at slaughter-houses. I have never seen a single specimen of the lung of a full grown sheep that was entirely free from entozoic disease. The disease is not hereditary, since the lungs in young lambs are healthy. Nor, I conclude, is it restricted to any specific locality,

since I have found it at every place in Great Britain, France, Germany, and Switzerland that I have happened to visit.

The lungs, then, of any full-grown sheep taken indiscriminately will be found to contain, and often to be thickly studded with, small nodules varying in size from a pin-head to a barleycorn, or larger. The nodules are either small cysts, or firm soft deposits, or grit-like bodies. The cysts are filled with clear fluid, and contain cysticerci hanging upon an epithelial lining-membrane. The firm soft deposits consist of granule-cells and molecular matter, in which minute ascaris-like worms are found.* The gritty nodule is one or other of these which has undergone calcareous transformation. The particular point bearing upon my subject is, that this pulmonic affection does not prevent the sheep from furnishing excellent mutton. The condition of the animal for the market is often the finest possible. Not only has general nutrition been unimpaired, but there is reason for thinking that the animal may have been at first more disposed to fatten after the invasion of the entozoa than before. As sheep are rarely free from flukes in the biliary passages, it is difficult to decide how much influence is due to the presence of the hepatic, and how much to that of the pulmonary, entozoa. But we shall not greatly err in concluding that when both liver and lungs have their functions partially obstructed, so long as irritative disease is not set up, nor anæmia induced, the surplus hydro-carbon is excreted vicariously into the reservoir-cells of the adipose tissue, causing the animal, in the absence of brisk exercise, rapidly to grow fat. As soon, however, as the blood has become too much weakened by loss of albumen, emaciation and dropsy take the place of fatness.†

We do not of course infer that the presence of tubercles in the lungs would interfere with health as little as that of these entozoa ordinarily does. Tubercles imply constitutional disease. The pulmonary entozoa do not. Still, the analogy may be used to support the conclusion derived from other considerations, that the mere presence of tubercles in the lungs, so long as they are unattended by inflammation, is compatible with the appearance of health, and with a fair share of the reality also.

Could we manage to keep existing tubercules quiescent, we should fulfil the first condition of safety.

But there is probably only one form of tubercle that can remain permanently unaltered and quiescent, viz., Bayle's granulations, or the small semi-transparent tubercles. When none other than these exist, it is impossible to decide with certainty, so long as they remain unchanged, that the patient is tuberculous at all; and equally impossible, on discovering such tubercles after death, to say for how long a period they may have existed in this latent form. Such unmixed cases are rare, but from their occasional occurrence we infer that some of the small firm semi-transparent tubercles commonly found in an ordinary case of phthisis, *may be* of considerable age. It is indeed entirely unknown for how long

* Is there any relationship between these minute worms and the larval condition of the flukes? The ova of flukes might readily find their way into the lungs.

† A celebrated agriculturalist, Mr. Bakewell, when he desired to fatten his sheep, quickly, was in the habit of sending them to pasture in the neighbourhood of a certain pool which was infested with the ova of flukes. The sheep fattened greatly for a time, but eventually, if not sold, were as certain to fall off in condition.

a time before the outbreak of developed consumption, the lungs may have been the seat of latent tubercles.

Primary yellow tubercle in all probability is never latent, being never free from attendant inflammation. Bayle's granulations are probably latent, as the rule. Semi-transparent grey miliary tubercles are probably latent at first, manifesting their presence gradually as they progress.

We may assume that the elements of a slowly progressing tubercle have a certain term of existence, at the end of which they infallibly undergo degeneration. The change may take place so slowly and quietly, and may occasion so small an amount of irritation in the surrounding pulmonary texture, as not to prove destructive in its issue. The patient's death in phthisis is not caused by the degeneration of the tubercle simply, but by the destructive influence of the degenerating tubercles upon the adjoining texture. The very same mode of degenerating, therefore, which in the more common case leads to death, may in another case, wherein it does not induce much local irritation, pursue its course without any considerable damage to the economy.

That tubercle shall degenerate slowly and gently when its time comes, is another main condition of safety.

Arrest by Transformation.

When a tubercle has undergone a curative transformation, some one or several of the following changes are found to have taken place in the tubercle and lung immediately around it:—Liquefaction; absorption; fatty degeneration; granular degeneration; calcareous degeneration; pigmental degeneration; shrivelling; sequestration.

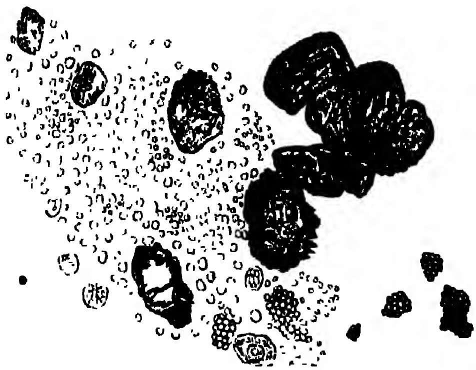

Fig. 23. Moist Calcification of Pulmonary Tubercle.—From the mortar-like fluid around a hard mineral concretion, the size of a hemp-seed. Grey tubercle predominating. The fluid presented scarcely anything except free oil-vesicles, loosely floating, and small mineral concretions. There was an occasional nucleated cell. Abundance of black pigment, but no fibrinous capsule, existed around the site of the concretion. All the calcareous matter was amorphous: no crystals, either of lime or of cholesterine.

The most common instance of safe transformation includes several of these alterations. We have the disintegration of the original corpuscular elements of the tubercle; the partial removal of them by absorption; the substitution in their stead of oil, cholesterine, and calcareous matter; and,

around the whole a quantity of black matter in condensed lung-tissue, or, a distinct fibrinous capsule. Reduced to such a *caput mortuum*, a tubercle is passive, no more offensive than an encysted pellet, and may remain without further change indefinitely.

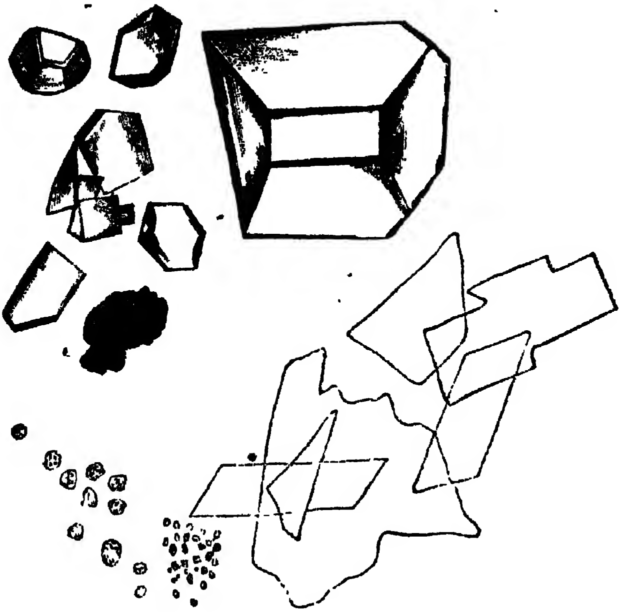

Fig. 24. Moist Calcification of Pulmonary Tubercle. — From concrete mortar-like dots upon the lining membrane of a large closed cavity. In each dot, when crushed, and floated under the microscope, were presented — shrivelled pus-cells, free fat in abundance, no tubercle-cells, plates of cholesterine, calcareous matter in amorphous heaps and in crystals.

For tubercle, the natural cure consists in its mineralization. And in this there is nothing peculiar to tubercle. Any normal texture which becomes too feeble in active power to keep itself fitted for the discharge of its function, provided its course be not interfered with by inflammation, tends to become less and less endowed with animal life, and sinks gradually through a stage of vegetable life into the mineral condition. And to this slow descent in the scale of vitality the adjoining texture accommodates itself, becoming by the same degrees as fitted for harmless contact with the mineral matter as is the living texture of the bones or teeth. The whole indeed is typified in the conversion of bone-cartilage into healthy bone. We see other examples in the general hardening of the soft tissues in old age; in the senile ossification of the costal and laryngeal cartilages; in calcification of the valves of the heart and coats of the arteries. So far, such changes are only the normal consequences of age; the slow instalments by which Death asserts his right. But it is by changes precisely similar that any morbid product, if not interfered with by inflammation, will slowly and safely die. Any considerable exudation of common lymph is usually the result of inflammation, and is too much accompanied by it to furnish an illustration in point. It

liquefies and is absorbed, or suppurates and is discharged, or dies rapidly; processes all too quick for safe degeneration. But in the oldest coatings of an old aneurism we may find oil-molecules and cretaceous particles. And the same in old enlarged partially calcified lymphatic glands in non-tuberculous subjects; and in some chronic non-malignant tumours of the uterus. We may therefore conclude that simple lymph, if left alone, provided it could neither become properly organized nor altogether absorbed, would ultimately pass on towards the mineral state. Nor is there any reason to doubt that any variety of malignant formation (cancer), in which the fast life and rapid death which confer upon it its dangerous character, could be exchanged for a very slow mode of dying, would likewise pass through a fatty into an earthy condition. Portions of slow cancer are sometimes met with in which such alterations can be demonstrated.

The natural cure of any disease, consisting in the restoration of disordered actions to their normal course, must ever follow some plan of normal working. The physiological course of dying pursued by any portion of the body which dies without compromising the rest, is the same as the pathological course by which alone a morbid formation can die with safety to the economy. Cure of tubercle is death of tubercle so gradually and quietly brought about as not to entail death of the entire body. A cretified tubercle is a dead tubercle. A softened tubercle lead-

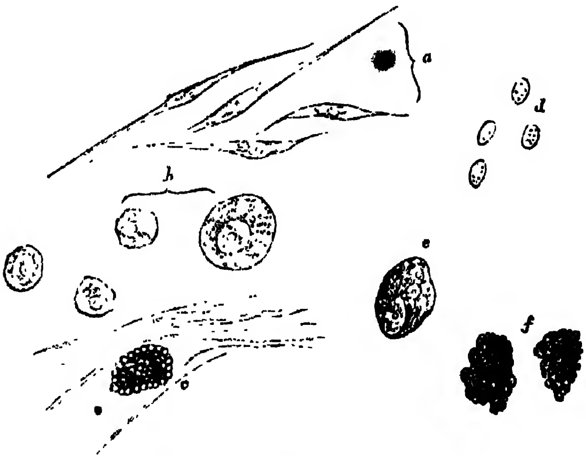

Fig. 25. Dry Calcification of Pleural Tubercle.—From a dark-grey tubercle, hard, yellow, and calcified in the centre; situated in a pleural adhesion between the first and second lobes of the right lung.

From uncalcified part—
a. Fibres developing.
b. Nucleated cells.
c. Glomerulus.
d. Tubercle-corpuscles.
No many-nucleated cells.

From calcified portion—
e. Large nucleated cell, apparently calcifying.
f. Amorphous calcareous masses.

ing to ulceration is also a dead tubercle; but the one has died safely, the other not.

The phenomena of the natural course of chronic tubercle are best explained by assuming that the tubercle at the first is endowed with a

certain very low amount of vitality, as evidenced by its ability to form cells (however imperfect or lowly), and by its power to maintain itself

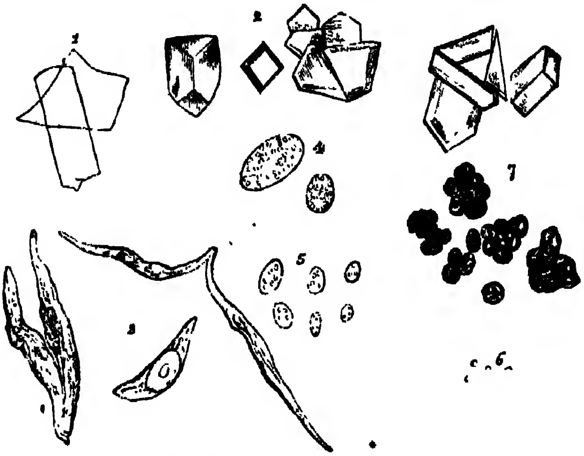

Fig. 26. Dry Calcification of Sub-peritoneal Tubercle.—No inflammation around it. Many other grey tubercles which were not calcified, dotted the peritoneum. This one was the size of a large pin-head, whitish, semi-opaque, not cheesy. It was situated in the areolar texture beneath the peritoneum, which was lifted off over the tubercle, so as to form its roof. In the fibrillar matrix were numerous granule-cells, and single tubercle-cells, and free fat-vesicles, all matted together. No many-nucleated cells.

1. Cholesterine.
2. Mineral matter, in crystals.
3. Fibres.
4. Glomeruli.
5. Single tubercle-cells.
6. Free fat.
7. Calcareous matter, in amorphous nodules.

statu quo for a given length of time,—indefinite and probably most variable as this may be. A tubercle cannot of course undergo that molecular removal and deposition, retaining its form the while, which constitute the nutrition and maintain the life of healthy structures of the higher class. But this is unnecessary to our assumption. Having no function to discharge, a tubercle needs not an active form of life. Having only to keep itself as it is, like an unhatched egg, it needs only a passive vitality. It is a reasonable conjecture, that whilst in constant contact with vitalized fluid and living structure, a tubercle may possess this low degree of life. Some healthy tissues, whose office is merely a mechanical one, have scarcely more.

If this be so, the period during which a tubercle is latent is the term of its life. No sooner does it cease to nourish itself than its degeneration commences, and more or less irritation ensues. The measure of the life of a tubercle is its duration before softening. In proportion therefore as the tubercle is small, transparent, and unsurrounded by inflammation, may it be considered as living. Possessing none of these characteristics, a yellow tubercle must be deemed not more alive than so much pus.

To keep a tubercle alive as long as possible, is tantamount to keeping a tubercle latent as long as possible; and the possibility, if it be a fact, concerns our reasonings rather than our practice; excepting in so far that the method best adapted for keeping progressing tubercles as quiet

as possible, is doubtless the method most suited for preserving latent tubercles unchanged for the longest period.

Liquefaction.—Between the softening which is innocent in its results, and that which is destructive, what is the difference? The only difference we can discover is that of the time occupied in the process. Rapid softening of tubercle is always destructive. And in proportion as the disintegration is slow and gradual, the more is it accompanied by the formation of innocent compounds, such as oil and lime. So slowly is the change sometimes effected, that there does not occur a general melting down of the whole tubercle at once, but such a bit-by-bit softening, that one portion of a tubercle is found to have been changed into cholesterine and calcareous matter, whilst the rest has not lost its crude condition. Whether by such very partial, or by a more general change, the melting of crude tubercle into a fluid is probably an essential preliminary to ulterior changes, whether these are to be for good or evil. It will, however, be shown presently that the amount of liquefaction varies extremely.

Absorption.—The occurrence of a single specimen of obsolete tubercle, wherein no trace of the corpuscular elements which once existed is to be found, suffices to prove that the internal removal of tubercular matter is possible. Liquefaction and absorption, either atom by atom, after the fashion of normal nutrition; or by solution in the gross, and subsequent

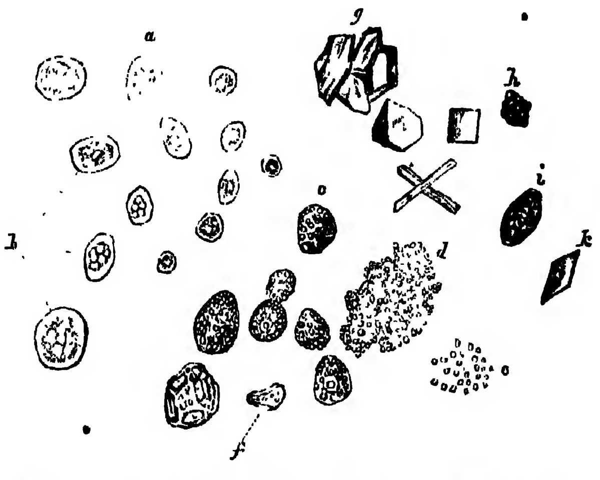

Fig. 27. Dry Calcification of a Mesenteric Gland.—This was from one of a mass of tuberculous mesenteric glands. It was the size of a hazel-nut; partly flesh-coloured, partly yellow.

a. Granulous nucleated gland-cells.
b. Gland-cells, possessing several nuclei and clear space near the margin; these were not very abundant.
c. Gland-cells, fattily degenerating; very abundant.
d. Patch of fatty débris; plentiful.
e. Free fat; abundant.
f. Cells apparently degenerating by simple, and not by fatty, atrophy.
g. Mineral matter in crystals.
h. Amorphous mineral matter.
i. Black pigment-cell.
k. Orange (i.e., hæmatin) crystal.

absorption of the liquid, offer the only conceivable channel. Hence, tubercle can be absorbed. But whether it can ever be so absorbed as to leave not a trace behind, is another matter. Most probably the absorption

is never complete, but occasions merely the removal of the more soluble portions of the tubercular material, leaving behind the rest, which, with or without subsequent addition, forms eventually a permanent relic quite different in chemical composition to the original tubercle.

Of the perfect absorption of nascent tubercles, it is not easy to imagine what proof would be possible. Certainly, such proof is not to be found in the disappearance of dulness, and the restoration of presumedly healthy respiration in the pulmonary apices in certain cases which have been published as examples of arrested phthisis. Granting the existence of miliary tubercles in these instances, the physical signs are due to the accompanying inflammatory changes, and will disappear if the whole of these can be made to disappear, notwithstanding that the tubercles, either stationary or transformed, still remain. These cases, satisfactory as they are when observed by such observers as some who have narrated them, as evidences of arrested tubercle, are no evidence whatever that the arrest has taken place by means of absorption. At present we are without any grounds for hoping that tubercle can ever undergo entire absorption. The conditions of the deposit are against it; for even if the tubercle itself could so liquefy into a simple fluid as to be fitted for complete resorption, the state of the parts in which it lies is unfavourable to it. Vascular by nature, as it is, immediately around the tubercle, the lung no longer possesses its natural condition. If not condensed by exudation-matter, still it can no longer have its natural freedom of capillary circulation close to such a firm morbid deposit as even the smallest and most innocent tubercle constitutes. There must always be a tendency to more or less of stagnation of blood around even a Bayle's granulation; and in most instances of arrest, the metamorphosed tubercle is narrowly enclosed by a bed of black matter, which in itself indicates that there has been such a stagnation of blood; or, by firmly contracted pulmonary texture, in which but little circulation of any kind can have been carried on; or lastly, by a dense fibrinous capsule. In every case the conditions are such as do not favour absorption.

Absorption, nevertheless, must take place under the following circumstances:—The thinner part of the fluid plasma, when tuberculous blastema is exuded, is probably resorbed. For the thickening of liquefied tubercle on its way to cretifaction, absorption is necessary. And in certain closed tuberculous abscesses, which are only partially filled, the same probably occurs. Such an abscess may occasionally be found, varying in size from a pea to a walnut, forming a perfectly closed cavity, which is not more than half-filled by its pus-like contents, and is lined throughout by a soft velvety coat. In the surrounding lung, which is for a certain distance consolidated, the bronchial tubes end in blind conical terminations, which are sealed up by fibrinous adhesion, next to which lies a little concrete pus. This is the state of things after death. During life, of course, there was no empty space in the vomica. It was filled according to its then capacity; but it had contained more fluid formerly than recently, and had latterly been accommodated to the reduced quantity of its contents by the pneumatic pressure of the lung. This being granted, there are two modes only by which the reduction of the contents of the vomica could have been effected; by the now closed

vomica having once communicated with a bronchial tube in the ordinary way, and, after having partially emptied itself, having had its communication closed up and healed—which is so opposed to the ordinary course of events, that we can hardly venture to accept it; or by absorption from the vomica, closed in from the first, of the thinner portion of its contents.

We must conclude, that tubercle may be sufficiently absorbed under favourable circumstances to be rendered innocuous; but that its capability to undergo perfect and entire removal by absorption in any case, is unproven and improbable.

Fatty Degeneration of Tubercle.—All normal tissues, and all morbid formations, and perhaps we may add all animal fluids which can become inspissated whilst within the body, are susceptible of transformation into oily matter. This assumption of the form of a product which is not peculiar to the animal kingdom, is in every instance a sign of declension in the scale of vitality. When it affects what is useful to the economy, it is of course an evil; but when it affects what is itself injurious to the system, it becomes a benefit. It is the stepping-stone towards the gradual removal, or the safe housing, of that which cannot directly melt into simple liquid fitted for absorption. It is the half-way stage between the animal and mineral conditions. It affects tubercle in various degrees. When there is but little of fatty degeneration, with much of granular detritus and of liquid, the softening is of a bad character and ulcerative tendency; but in proportion as there is more of fatty metamorphosis, with plates of cholesterine and particles of lime-salts, is the softening slower, less locally irritating, and therefore safer.

To a greater or less extent, fatty degeneration plays an essential part in all slow softening of tubercle. Whether in a given instance it will prove curative or destructive, depends entirely upon the attendant conditions, particularly in respect to the time permitted for the performance of the change.

Granular Degeneration of tubercle is simply its disintegration into such molecules as are not oily. The resultant molecular matter is ordinarily considered to be albuminous. More or less of it attends every stage of the transformation of tubercle into cretaceous matter.

Calcareous Degeneration.—Mineral matter is met with in tubercle in the amorphous and in the crystalline form. The amorphous is most common and abundant; to the naked eye it resembles bits of grey hard mortar, either in loose particles or in masses; under the microscope it is black and opaque, and when crushed as fine as possible, the small particles being highly refractive, have a resemblance to oil-dots. In chemical composition, Boudet stated (1844) that they consist principally (70 per cent.) of the soluble salts—chloride of sodium, phosphate of soda, and sulphate of soda. Before that, Thenard had found them to be composed almost entirely of phosphate of lime, with a little carbonate of lime. More recently, Scherer, and several other authorities referred to by Simon, have arrived at the same conclusion. It may, therefore, be decided that the old opinion is the correct one; and that a calcified tubercle consists mainly of the insoluble phosphate and carbonate of lime, held together by a little animal matter.

The crystals resemble those of triple phosphate, which they probably are.
Before any calcareous matter in a distinct form can appear, it is requisite that the crude tubercle shall have liquefied, either generally or partially. Crystallization requires such a physical condition as will allow

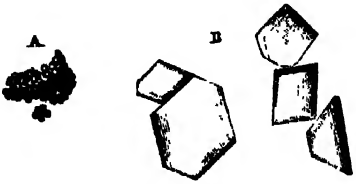

Fig. 28. Mineral Concretions from Tuberculous Bronchial Gland.
A. Amorphous; most abundant. B. Crystals.

the saline atoms to move freely into the sphere of their respective affinities, and can therefore only take place under the fluid condition, either gaseous or liquid. The presence of crystals in a tubercle, therefore, demonstrates that there has been fluidity. But as we sometimes notice crystals of hæmatine under circumstances where the fluidity must have been limited to a very small point, the crystals in a metamorphosed tubercle do not necessarily prove that there has been any universal liquefaction of the tubercle at once. That may have been so; or, on the other hand, a minute point of tubercle only may have been liquid at the moment of crystallization. And if general liquefaction of the tubercle be not an essential preliminary to calcification when crystals are present, still less can it be considered as a *sine quâ non* when merely the amorphous variety of calcareous matter exists.

We will assume that a tubercle may attain the state of calcification, either by way of general liquefaction (moist calcification), or by way of comparatively dry fatty metamorphosis (dry calcification).

When we find a mineral concretion closely invested by condensed lung, nested-in, as it were, without any fluid about it, it is impossible to draw any conclusion as to the degree of liquefaction which may previously have taken place during the calcifying process. But when we see a tubercle dry and cheesy, which contains granules, abundant fatty molecules, plates of cholesterine, and calcareous particles, there is no evidence that fluid *in notable quantity* has any share in effecting the transmutation. We have examples of this when we find a nucleus of calcareous matter in the centre of a crude pulmonary tubercle; when a grey opaque tubercle on the peritoneum is only partially calcified; when a tuberculous bronchial or mesenteric gland is solid and gritty, from the presence in combination of unsoftened tubercle and calcareous matter. In the large entozoic abscesses so common in the lungs of the ox and the pig, no stage of general fluidity seems to intervene between that of thick sticky pus which follows the death of the cysticerci, and that of calcareous formation.

The practical interest of the question resides in this:—If tubercle can reach its ultimate safe condition of calcification without having general softening as a necessary antecedent stage, this must be the most favourable

course; and if so, *the cure of tubercle, by cretifaction will proceed the best when there is least of local or constitutional manifestation of its performance.*

The origin of the lime-salts is probably twofold, original and superadded. Primarily, they are merely the insoluble elements of the original tubercle, left behind when the remainder is dissolved and removed by absorption. During the early stage of fluid blastema, these salts are held in solution, or mechanically suspended, just as they constantly are in the blood-serum, and just as lime is in hard spring water. But after coagulation, and the resorption of the thinner part of the exudation, the mineral matter being left behind, bears a larger relative proportion—too large now to admit of being re-dissolved when the solid tubercle liquefies. Moreover, just as the hard water on losing some of its carbonic acid by boiling, becomes unable any longer to retain all its lime in solution, so may the tubercle-salts undergo some chemical change which deprives them of the solubility which they formerly possessed. In whatever way it arises, the insolubility of these salts renders them as fixed, as the insolubility of its carbon renders the pigment in black pulmonary matter.

The mineral matter of a calcified tubercle, however, is ordinarily more than could originally have entered into the composition of the tubercle. According to Thenard, whilst crude tubercle contains only three per cent. of mineral matter, a calcified tubercle contains ninety-six per cent. This does not prove much, unless it can be shown that the tubercle has not dwindled down from its original size in a corresponding degree. There is always some reduction in size, although in the lungs this is difficult to estimate, owing to the extensive shrinking and puckering of the lung around the cretified tubercle. In some instances, however, its occurrence to a large extent is undoubted. But amongst tubercles on serous membranes we frequently find a calcareous nodule as large as any of the neighbouring little tubercles, in which it is plain that there is more of earthy matter than could have belonged to the original tubercle.

There are certain appearances in an incipient stage of calcification which seem to indicate that the mineralization sometimes commences in the cell-formations of the deposit. This is less obvious in tubercle than in other deposits in which bolder cells are present. In one instance (see fig. 29) the nucleus of a cell of bronchial epithelium found in a partially calcified entozoic granule-mass in the lung of a sheep, appeared to be the seat of calcareous deposit before the rest. And the general resemblance in outline of clusters of cells to masses of calcareous matter in many instances suggests the idea of a sort of petrifaction having affected these. If this be so, it is only similar to what happens when dissolved hæmatine is attracted towards the nuclei, or into the interior of cells (see fig. 30). For any such petrifactive process, lime in solution, over and above that originally present in the tubercle, must be supplied. Considering the long duration occupied by the process, there is no difficulty in admitting that the fluid of the softened tubercle when in contact with lung-tissue may, by intermixture, obtain from the serum of the blood the required addition of lime-salts for the augmentation of the calcareous deposit already there.

The state of the pulmonary texture which immediately surrounds a

tubercle cured by calcification, is obviously a subject of great interest. We might expect that we could learn at once what condition was most favourable to a termination so desirable: but the information is not easily gained. In one instance, we find a calcified tubercle embedded in lung

Fig. 29. From Sheep.—From a cretifying granule-mass, which had formerly been the nidus of worms in the lungs of a sheep. Many-nucleated cells and bronchial epithelial cells apparently withering and becoming the seat of calcareous deposit.

which is merely condensed and blackened with pigment; in another, the lung is apparently healthy, but separated from the calcified tubercle by a fibrinous capsule; in a third, the surrounding lung may present any degree of inflammatory consolidation. Are we, then, to conclude, that the condition of the surrounding lung is a matter of indifference as regards the calcareous degeneration of the tubercle? By no means. When inflammation exists, there is always reason to infer from the general appearances presented, either that it arose subsequently to the mineralization of the tubercle, or else, if it preceded this, that it was of that mild plastic kind which, in surgery, is styled adhesive inflammation.

Calcification is the great arrestive change of developed tubercle; but it is often abortive. A young person may expectorate cretaceous particles, and never have phthisis; but another person may do the same towards the close of mortal consumption. In a large cavity we may find such numerous cretaceous particles, that the lining membrane is gritty to the touch, and yet the course of that tubercle-mass had proved destructive, notwithstanding this tendency to cretifaction. Or again, many small tubercles may be found perfectly calcified, and thereby cured so far as they individually were concerned; but inasmuch as many other tubercles had run the destructive course, this partial cure was futile. It is indeed very rare to examine a case of chronic phthisis after death without observing some evidence of tubercles having undergone calcification.

Pigmental Degeneration.—After adult age, as is well known, the lungs are never free from dark streaking. This darkness increases in extent as age advances, so that the black mottled lung of the old always forms a marked contrast to the pinkish lung of the infant. In every case of chronic phthisis, we find more or less of this black matter. In primary

acute phthisis, it is not necessarily present. It always exists in abundance around the firm walls of old cavities; around cicatrices; around calcified tubercles; and in the immediate neighbourhood of a cluster of shrunken miliary grey tubercles. It is therefore an habitual concomitant of every form of arrested tubercle.

On the other hand, in certain cases the blackened lung is so hard and evidently disabled in function, that the presence of black matter has been accounted a specific disease. The diseased lung "as hard as granite, crackling under the scalpel, breaking with a metallic lustre, presenting small cavities filled with pus-like fluid, and accompanied by suppuration in the adjoining bronchial tubes, occasioning during life the ordinary symptoms of phthisis,"—in such terms Bayle described the disease as phthisis from melanosis. Haller had previously referred to it as constituting "a horrible species of phthisis, in which the lung is filled with a substance as black as ink." Besides the diffused black induration, there are other cases in which the lung is filled with distinct hard black knobs and nodules, the intervening tissue appearing to be natural. Some of these black knobs are softened in the centre, containing, however, not black, but the ordinary yellow fluid of softened indurations. Others sometimes enclose the cretified remains of a tubercle; and there is usually the common kind of tubercle present in some other part. In another case, the lung may be full of black softening nodules, whilst soft cancer exists, either with or without blackness, elsewhere. In every instance of common chronic phthisis which has proved fatal, we find abundance of blackened lung. The change is therefore an habitual concomitant of chronic tubercle when it pursues a destructive course.

Now, are these several varieties of black lung the same thing? As regards the blackness, yes; as regards the disease of which the blackness is merely the accompaniment, no. Just as hæmorrhage may attend repeated congestions, or pneumonia, or tubercle, or cancer of the lung, so may the pigmental change. When, therefore, Bayle described a melanotic phthisis; Laennec considered melanosis of the lung as a species of cancer; Andral viewed it as a peculiar form of chronic pneumonia; and Hasse, under the term pseudo-melanosis, distinguished two forms of black pulmonary disease, an innocent and a malignant; each of these eminent authorities was quite accurate as far as his observation extended.

As to the consequence of this black change, those who, like Laennec, draw a generic distinction between the common black matter and the black matter of melanosis, of course consider all blackening of the lung which exceeds the physiological amount as unequivocally bad. Dr. Paxton, without drawing any such distinction, remarks, that "We ought to be no longer under the erroneous impression that the retention of uncombined carbon has any other than ill consequences."* Others consider, with Dr. Hope, "the black pulmonary matter to be altogether compatible with perfect health." M. Nathalis Guillot was the first to affirm (in 1845) that the formation of black pulmonary matter around tubercles exercised a direct curative influence over them. He considered it to be a deposition of carbon, which occluded the vessels around the tubercle by choking-up, as it were, the tissue of the lung, and so cut off the tubercle

* Transactions of the Provincial Medical and Surgical Association, vol. xvi. p. 51.

from the influence of the circulation. He stated (as formerly remarked) that every tubercle is separated from permeable lung by a zone, into which the pulmonary capillaries do not enter, but in which twigs from the bronchial arteries anastomose with twigs from the arteries of the thoracic walls through the intervention of pleural adhesions. This zone becoming filled with carbon, the tubercle, thus walled in by a charcoal barrier, ceases to receive any nutritious supply, and therefore ceases to grow. This conclusion he founded chiefly on two circumstances. First, that all tubercles which are found in a cretified state, all cicatrices presumed to mark the site of former tuberculous cavities, or puckerings around shrunken tubercles, have, as a rule, a quantity of black pigment close around them. Second, that when tubercles in the aged are so close together as not to admit of any black deposit between them, they pursue the destructive course. It is obvious that neither of these reasons is conclusive. The former may be a mere coincidence; and the latter admits of a different explanation. However, there is still some value in the supposition that the black matter tends to promote arrest.

What is the nature of the pigmental degeneration? The lung might be rendered black by the infiltration of a black secretion; by the introduction of insoluble black matter from without; by a defective excretion of carbonic acid, causing (if it can do so) a precipitation of carbon; by a metamorphosis of extravasated red blood-globules; or by a solution of the colouring matter of the blood first infiltrating the tissue, and then precipitating its altered colour-element.

Seeing that it is presumable that all colouring, both of tissues and secretions, arises ultimately from changed hæmatine, there is little real difference between the first and the last of these hypotheses. Laying aside, therefore, the first, the second expresses a demonstrated fact. Carbon is really introduced from without, and works its way into the lungs from the bronchial tubes and air-cells, in coal miners and others who constantly inhale the thick smoke of the candles by which they see to work. After a time, this smoke-carbon induces local irritation, and, under the name of miner's asthma, is analogous to the pulmonary disease of masons and knife-grinders occasioned by the habitual inhalation of stone dust or iron particles. Designated anthracosis, this, which is the correct explanation of certain cases, was incorrectly applied by its discoverers to all instances of black pulmonary change. We may at least deduce from it (taking into account the co-presence of other irritating elements of smoke), that a large quantity of carbon will in the end act as an irritant when introduced within the texture of the lung.

Heusinger's idea (with which Dr. Paxton coincides), that the black matter is due to defective elimination of carbonic acid, is inadequate to explain the presence of black pigment in the centre of a tubercle, or cancer, or upon the pleura or peritoneum; whilst all the arguments in its favour are equally well explained by ascribing them to obstructed circulation in the part, or in its immediate vicinity.

The only view which will at once meet all the facts, is that foreshadowed by Breschet, Andral, and Dr. C. B. Williams, cleared up by the German pathologists, and now generally received—that, namely, which refers all black colouration of tissues to a direct transformation of

the colouring matter of the blood. The most clear and masterly account of what is known on the subject is given by Rokitansky.*

We occasionally find extravasated red globules in the substance of tubercle; we may always find them in the lung-tissue close to tubercles, at every stage of transformation into black pigment. They may be seen in the interior of filmy cells, within which they disintegrate and change into orange, brown, and finally, black molecules, thus eventually forming cells filled with black granules; or, remaining unenclosed, they pursue a similar course as free molecules. The changes of colour of a common bruise doubtless depend on similar metamorphoses of the red globules extravasated into the skin.

But there are other appearances, only to be explained by assuming that the hæmatine has first been dissolved and then the coloured solution imbibed by the cells of the morbid formation, or tissue, and afterwards precipitated within these in the shape of black molecules.

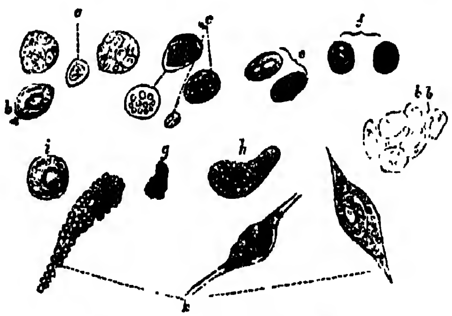

Fig. 30. Pigmental Change of Lung.

a. Compound cells, not blackened; few. *b.* Single nucleated cell.
b. b. Small flake of epithelial cells. *c.* Pigment-cells, not nucleated.
e. f. Pigment-cells, nucleated. Those bracketed together are the same cells seen at different foci.
g. Black pigment, concreted, apparently not in a cell.
h. An orange-coloured cell (? a bronchial cell, degenerating, and stained with hæmatine).
i. Round nucleated cell, in which black pigment seems to have concreted in contact with the nucleus.
k. Bronchial epithelial cells, blackened with pigment.

In this manner only can we account for the partial or complete blackening of bronchial epithelium, or nucleated round cells, or fibre cells, or cancer cells.

Pigmental change, then, whether in the form of free black molecules, or of the same in cells, is essentially a degeneration of red blood-globules, a safe local necræmia, and must always imply a previous obstructed state of the capillary circulation at the part. In chemical composition, it is carbonaceous—indeed, as carbon is the chief fixed element of organized bodies, all dead organic matter, decayed wood and dry gangrene alike, is chiefly carbon, and is more or less black.

According to Rokitansky, black pigment in the lungs causes thickening of the areolar tissue, which impedes the development of the air cells, gradually obliterates their vessels, and so occasions their atrophy. Senile atrophy of the lungs, he states, is undoubtedly often induced by an ex-

* Sydenham Society's edition, vol. i. p. 204; vol. iv. p. 101.

cessive accumulation of pigment in the interstitial tissue. "It is the result of slight irritative processes and of transient stases; the pigment is conveyed by absorption to the bronchial glands, and is thus deposited in them,"—probably it is absorbed in the form of a solution of hæmatine.

It thus becomes intelligible how a small amount of black degeneration of lung is unimportant, whilst an excessive amount may induce of itself serious disease; how, when the blackness is merely a dress worn for the occasion by cancer, blackness of lung will be malignant; or, when assumed by tubercle, the term employed by Dr. C. B. Williams, of "black tubercle," becomes strictly applicable. Not so, perhaps, the remark of Haller, that this form of consumption is unusually "horrible;" on the contrary, it is habitually more chronic than usual.

And although pigmental deposition often fails to check the destructiveness of tubercle, yet, as Guillot contends, it is, in a tuberculous lung, of good rather than of evil import. It is so both for what it implies and for what it does. It implies chronicity and the absence of acute inflammation. It leads to a diminished supply of blood-plasma to the periphery of the tubercle, and incapacitates the portion of lung immediately around the tubercle from mechanical movement and functional activity. It surrounds the tubercle with a barrier both physical and vital. By lessening the supply of blood it starves the tubercle, and so prevents its increase in size—in itself a great gain. As vascularity is lessened the chance of acute inflammation lessens, and the tubercle is left to itself, to undergo its natural degeneration slowly and quietly; and, next to having a tubercle quite stationary, to have it left to itself without adjoining irritation, affords the most advantageous terms. Even if, when in excess, black pigment is itself somewhat irritating, provided it exclude the presence of more tubercle, by occupying the place of it on the one hand, and by occluding the capillaries on the other, it is so much of a gain, as black pigment *per se* is a more innocent formation than tubercle.

This question is of little importance during life, since we cannot, from greyness or black streaking of the sputa, augur anything. But it seems very interesting in pathology from its accordance with the anti-tuberculous tendency of compression and diminished vascularity evidenced under other circumstances.

Shrivelling; Cornification.—On the authority of Rokitansky, grey semi-transparent miliary tubercles may change into horn-like nodules. In his opinion, this is the *only* kind of metamorphosis to which this particular tubercle is liable. Reasons have already been assigned for preferring the view more generally entertained. Bearing in mind the cartilage-like resistance and condensed appearance of the tubercle called Bayle's granulation, and of the smaller grey distinct tubercles in general, it seems difficult to discriminate between these and a tubercle said to be cornified. No doubt, *all* firm semi-transparent tubercles are dried, and more resistant than they were at the earliest moment of their formation; but this is for them only the mature or crude condition, and not a state of decadence. Having no personal knowledge on this point, I will merely quote Rokitansky's brief and clear description:

"After abiding in the primitive, *crude* condition, the simple fibrinous tubercle becomes transformed with the loss of its moisture—with condensation—to a hard

nodule, and shrivels into a tough, amorphous, or indistinctly fibrous horn-like mass—in a word, *cornifies*. This determines a complete wasting or death of the tubercle, subversive of all further change." *

Primary yellow tubercle is never changed into a hard resistant nodule by any other method than calcification. When completely calcified, the hardened mass occupies less space than did the original tubercle, the lung is condensed and puckered around it, and hence both tubercle and pulmonary texture may be said to have undergone shrinking—but this is not of the same character as the shrivelling of grey tubercle described above. A slight degree of shrivelling, however, without previous calcification, may be assumed for yellow tubercle under the following circumstances.

Sequestration.—We sometimes find a distinct yellow tubercle, firm, smooth, and leathery, seldom exceeding the size of a bean or hazel-nut, which is surrounded by a distinct fibrinous capsule. It may be situated in apparently healthy lung, or in inflamed lung; but in the latter case the inflammation has obviously been a subsequent occurrence. Such a capsulated tubercle may be found by itself in a lung which is elsewhere riddled with cavities. It is quite evident that the capsulated tubercle is an old one. It has, therefore, apparently been saved from pursuing the destructive course of the other tubercles by the circumstance of its isolation by means of its fibrinous capsule. We may conjecture that such a tubercle was laid down early in the disease, that by some temporary improvement in the cachexy, healthy induration-lymph was thrown out around it: that this, becoming as much organized as such low fibrinous tissue requires, contracted around the tubercle, which thus became subjected to the twofold influence of compression and diminished supply of blood. Under such circumstances, a yellow tubercle may be considered to have undergone a certain degree of shrivelling.

We have never met with a grey semi-transparent tubercle capsulated; and yet, as this is the more sthenic variety, we might anticipate that it would be more likely to be surrounded by a sthenic kind of lymph than the yellow tubercle. And as the freer access of blood, in consequence of the small size of a grey semi-transparent tubercle, has been assigned as a means of keeping such a tubercle stationary, is there not a seeming contradiction in now ascribing to a cutting-off of the supply of blood a beneficial tendency?

A seeming contradiction only. So long as a miliary tubercle is minute and grey and transparent, and free from surrounding inflammation, neither the tubercle nor the lung-tissue included in it can be looked upon as quite dead. To keep it from dying, a supply of liquor sanguinis is an essential. A second essential is, that no inflammation shall interfere. So soon as inflammation does arise, the transparency vanishes. The tubercle becomes opaque, and thenceforward pursues the usual course. Now, as a fibrinous capsule can only originate from a certain (adhesive) amount of inflammation, and as this would occasion opacity, we see why the enclosed tubercle is never found to be of the semi-transparent kind. Yellow tubercle involves speedy death of the included lung-tissue, and is itself as devoid of vitality as pus. Like pus, it is susceptible of a very

* Sydenham Society's edition, vol. i. p. 295.

slow metamorphosis of a fatty and calcareous nature, during which it may produce no persistent local irritation, and which eventually converts it into an inert concrete. But, in order to do this, pus must be almost isolated from the circulation by its abscess-walls; the inflammation which produced it and its walls must cease; a lowly organized texture must in this way be interposed between the pus and the living tissues; the pus must be left to itself. In like manner, in the rare instances in which the inflammatory reaction of the lung around a yellow tubercle leads to the effusion of good adhesive lymph, unmixed with tubercle-plasma, the tubercle becomes isolated and compressed; it is not kept alive—for it is not alive to begin with—but, as inanimate matter, its changes are allowed to take place slowly, and therefore they do not irritate.

The fact is, that the two varieties of tubercle are virtually two things in their deportment towards the texture affected and the system at large. It is, therefore, no real contradiction to infer that a supply of blood-plasma is good for the one, bad for the other. Or, in other words, that it is desirable to feed that which can live, however humbly, and to cut off supplies from that which is incapable of living at all.

On microscopically examining a buff capsulated tubercle, we find abundance of oil-molecules, plates of cholesterine, some remains of tubercle-corpuscles, granular matter, and occasionally calcareous particles or masses.

Cure by Elimination.

After tubercle has softened and opened into a bronchial tube, the following modes of cure are still possible:

Hæmorrhage may take place and fill the cavity. The blood-clot, by sealing up and compressing the opened bloodvessel, checks the hæmorrhage. It afterwards gradually undergoes fatty and calcareous degeneration; the walls of the cavity contract around it, and ultimately form a cicatrix containing within it calcareous matter. Rokitansky is the sole authority for this; and the unusual concatenation of favourable circumstances under which alone it could happen, must render its occurrence so exceedingly rare that it is here mentioned first because mere allusion to its possibility will suffice.

After the softened tubercle has been ejected, the cavity may heal by union of its walls together so as to form a cicatrix;* or, it may remain open but contracted in size, ceasing to secrete pus, and forming an innocent blind fistula in communication with a bronchial tube; or, remaining open but not extending itself, it may continue to secrete pus in small quantity for an indefinite period.

When a cavity has contracted into a blind sinus, like a large offshoot from a bronchial tube, either it is lined by a soft velvety coat which will strip off the wall, or the wall itself presents a smooth free surface, without any distinct removable layer. The microscopic appearance of the surface is very similar in either case. It presents a network of delicate fibres, thickly dotted with granule cells entangled in its meshes, having

* See the beautiful illustrations given by Dr. Hughes Bennett, in his work on Pulmonary Tuberculosis. 1853.

none of the regularity of a pavement epithelium, but reminding one of the inner surface of an old abscess. When a cavity has ended in cicatrization, there may be simply a dense linear fibrous scar, without anything in it; or, what is more common, some calcareous matter is found imbedded in the scar. Under all circumstances, whether of partial or complete obliteration of the cavity, the adjoining lung is condensed, puckered, black, and usually emphysematous. The condensation and puckering are, of course, directly due to the contraction of the induration-lymph which is the primary step in the healing process. The pigmental change depends upon the obstructed circulation. The emphysema is caused by the compensation-expansion of some air vesicles in lieu of those which are atrophied in the condensation of the lung, on the pneumatic-pressure theory so clearly stated by Hasse, and fully argued by Dr. Gairdner. By lessening the vascularity and mobility of the part, both these changes promote the further progress of the favourable condition which caused them. And thus, once in a good line, all Nature's interpendent processes here become curative; as, in a bad line, they all aid and abet each other in proving destructive.

In order to admit of any of these favourable conditions, the lung-tissue immediately around a cavity must have been infiltrated with tolerably good lymph, or common induration-matter. This must be permitted to pursue its natural course of firmly contracting, and so drawing together the cavity it encloses; it must not, therefore, be interfered with by the continuance of inflammation. Inflammation at first is necessary for producing the requisite exudation, but after this the lymph is only injured by the persistence of inflammatory action. In short, in order to heal, either partially or completely, a tuberculous abscess must follow the course of a simple abscess. It must, therefore, as far as possible, have been reduced to the condition of a simple abscess beforehand. Now the lungs furnish an unfavourable site for the healing of even a common abscess, owing to their incessant movement. To obviate this, any lesion of continuity in the lungs requires to be first rendered, as much as may be, a fixed point. This is accomplished by surrounding it with induration matter. If, after this, *all inflammation subside*, and *the constitution be healthy*, the wound or the abscess in the lung will heal, always leaving behind it a certain amount of cicatrix. Under all circumstances a crude tubercle involves a solution of continuity, even before it begins to soften, because it has necessarily destroyed some of the texture of the lung. For a tubercle, therefore, entirely to disappear, and leave not a trace behind, is an impossibility. When it pursues its most favourable course, and undergoes arrest without ever forming an abscess, there is still a destruction of so much of the lung as the tubercle occupied space. Hence, a lung once the seat of tubercle can never be restored to perfect health, in the sense of restoration to its pristine anatomical state. Cure of tubercle can be nothing better than the safe destruction of the tuberculized portions, and a healthy condition of the remainder.

To the cure of a tuberculous abscess the previous opening into a bronchial tube, and emptying of the contents, are neither essential, nor do they constitute the most favourable course. In the lungs of the ox, we may frequently see examples of entozoic abscesses in every stage

towards obliteration, without ulcerating into a bronchial tube. First, there is a silvery fibrous cyst, presenting a smooth, bright, epitheliated surface, on which cysticerci hang sessile, and filled with clear transparent fluid. The cysticerci die; the lining membrane inflames and secretes pus; the inner surface of the cyst now looks rough and velvety, and the cavity is filled with greenish-yellow, very glutinous, thick pus. This, under the microscope is found to be unusually fatty; it presents abundance of free oil-molecules, and almost no pus serum. Minute gritty particles of calcareous matter may be felt on rubbing this pus under the finger, and are readily seen; later on, the proportion of calcareous matter is larger, and there is some shrinking of the cyst-walls; later still, the pus has disappeared, and the earthy matter has largely increased, forming an aggregate of closely-packed calcareous nodules, plates of cholesterine, and granular matter. The walls of the cyst have contracted around this concrete, and the final condition of a scar enclosing earthy matter is attained. In like manner may a tuberculous abscess attain the condition of scar-obliteration, without ever having been an open ulcer. If we find a large quantity of calcareous concretion in a dense puckered scar, we may infer with some probability that there had been no open cavity there, but merely a large vomica, or closed abscess. An open cavity is not favourable to the lodgment of calcareous matter on two accounts—first, because any that might be there would ordinarily be removed by expectoration; and secondly, because the admission of air excites the quick process of suppuration—i.e., the hyperoxidation of exudation-cells—rather than those slow transformations which lead to calcareous deposit. Still, the inference would not be unquestionable, since we do find small calcareous particles adhering to the membraniform lining of open cavities, which might escape ejection; and in addition to these, supposing such an open cavity to contract and close, some of the lymph effused into it during the closure might undergo calcareous degeneration.

The scar-obliteration of a cavity is the most complete and radical cure, so far as that one cavity is concerned. The cicatrix does not become the seat of tubercle, because of its density and non-vascularity; in accordance with the law that tubercle selects by preference the most vascular and least resisting parts.*

Of the absolute frequency with which such healing of a cavity takes place, we have no positive knowledge; probably it is not extremely rare; but of the infrequency with which it *so* takes place that the patient eventually recovers from his phthisis, we have sadly too established a conviction. The possibility of such a cure is quite certain; but that we have a right to anticipate it in any case of undoubted tuberculous cavity in the lung, all experience forbids. Nor is it difficult to see why this must be so. In the first place, the cachexy has to be removed. It is the fashion of the moment to speak as if it were an *easy* thing to alter the tubercular disposition in the constitution. We know better than formerly what to aim at, and how to act, but every honest observer must admit that his practical success falls far short of his knowledge. How-

* Illustrations of Tubercle, by Edward H. Sieveking, M.D., in Association Medical Journal May 27, 1853.

ever, passing by this grand constitutional difficulty, there is much in the local state to baffle us. A cavity cannot heal when its walls are surrounded by tuberculous nodules which soften in succession. A cavity cannot heal when its walls are surrounded by active inflammations constantly repeated; nor when its own internal surface is habitually the seat of inflammation. It cannot heal when placed in the midst of consolidation, which neither fairly suppurates nor yet contracts; and how many cavities are there of which these are not the attendant conditions? —the most opposite conceivable from those of simple abscess. And if a given cavity does heal, as probably one of the early formed in chronic phthisis not very unfrequently does, the cure of this individual cavity is of no eventual benefit, providing other cavities, which will not heal, coexist or supervene. It has happened in rare cases that only one large cavity existed, and that this has healed—a true case of consumption cured in its last stage. But as the rule, where there is one cavity there are several, and where there are several, the healing of one is insufficient, and the healing of many in succession is contrary to observation.

When a cavity will not heal, the next best result is, that it shall cease to enlarge. If it does not enlarge, after a time it will usually become less, will secrete less pus, and constitute a sinus, which, so long as it is kept free from inflammation, may permit of an astonishingly fair amount of health. Under favourable circumstances of hygiene, the period during which a patient will exist, and enjoy his existence, notwithstanding he has a cavity in his lungs, provided the disease be checked, is quite indefinite. I occasionally see a gentleman, aged fifty, whose history proclaims that the present large cavity in his right lung has been there for twenty-one years. Being rich, he resides in a mild climate every winter; yachts or rides out on horseback all summer; lives generously; takes wine and bitter beer, the steel mixture, and occasionally (of late years) cod oil. He keeps his digestive organs in good order, and any accidental increase of irritation in the lung is attended to by mild counter-irritation, intermitting the habitual routine of diet and tonics. This gentleman has expectorated flocculent pus, occasionally streaked, to the extent of from one to two ounces per day, during the entire course of his ailment. He enters into society, and enjoys his life. *He has a pulse of 70, and a cool skin.* With a quick pulse and hot skin, such a case was never seen.

Influence of Inflammation on the Cure of Tubercle.

Such are the several methods by which nature effects a cure in chronic pulmonary tubercle. How far are they promoted or opposed by the supervention of inflammation?

Fifty years since, when phthisis was made to include all chronic diseases of the lungs which are attended by expectoration and wasting, no doubt was entertained that inflammation was injurious. By disproving the inflammation-theory of the origin of tubercle, Louis and his followers have indirectly given rise to a vague idea that inflammation exercises but little injurious influence upon phthisis. Whilst still more recent pathologists affirm that, under certain circumstances, inflammation is a positive benefit.

There is always a tendency in reasoning, when we adopt one precise opinion, to reject its opposite, irrespective of modifying circumstances. This exclusiveness has ever proved very baneful in medicine. Because tubercle does not ordinarily originate in inflammation, and is consequently not essentially an inflammatory product, it does not follow that it *never* does. Because tubercle is always a constitutional disease, and usually arises spontaneously, or from within, it does not follow that it never arises as a local disease. Because without constitutional treatment we can do nothing in phthisis, it does not follow that by local treatment we may not do much.* Because arrested tubercle shows the results of inflammatory action manifest about it, it does not follow that all inflammation is good. Nor because tubercle never kills without inflammation, is all inflammation of necessity bad.

In speaking of inflammation we are hampered by language. The same word is used generically to express at once an extensive class, and every variety in that class. And when the various processes signified are so alike that no abrupt line of demarcation exists between them, yet so different in effect that at one pole we have merely a conservative modification of healthy nutrition, at the other a process necessarily fatal,—to express them all by the one word inflammation without qualifying it, can scarcely fail to engender confusion of thought. To avoid the merely verbal mistakes so often committed, we must define what we mean by the term, and qualify its application in using it.

Defining inflammation as a triple unity, consisting of a nervous element, a vascular element, and an extra vascular element—i. e., of congestion, exudation, *and of more local irritation than the mere mechanical effect of the vascular disorder will account for*,—I will briefly state what can be said for and against inflammation as influencing pulmonary tubercles.

There are four points respecting the bearing of inflammation upon phthisis which it is necessary to keep distinctly in view. 1. Is inflammation the cause of tubercles in all cases? 2. Is it the cause of tubercles in any case? 3. When inflammation attacks a lung which is already tuberculized, what is the dangerousness of the inflammatory attack *per se?* 4. What is its ultimate effect upon the course of the tubercles?

The first two of these questions admit of a categorical answer. Tubercles generally arise without inflammation. But they sometimes arise with inflammation in such manner that the inflammation seems to have occasioned their production; and also they sometimes follow in the wake of an inflammation in such wise that the inflammation seems either to have roused up a predisposition formerly latent, or to have itself made a predisposition which did not before exist. We see this illustrated by a close analogy in external tuberculosis of the bones, or joints, or lymphatic glands. In one case, tubercle is formed spontaneously, and inflammation follows. In another, an accidental injury excites inflammation, and tubercle follows.

The third question requires a guarded reply. The danger of an attack of pneumonia, when it occurs in a phthisical patient, depends on the stamina of the individual, the stage and extent of his phthisis, and the seat and extent of the pneumonia. It has been shown by Louis, Grisolle,

* I here refer more especially to the soothing and avoiding of local irritation.

and Walshe, that in itself this pneumonia is "less fatal than primary pneumonia. . . . . The mean duration of the inflammation even is less than when occurring in sound lungs. Some of the most marked examples of rapid resolution I have met with were in phthisical persons."*

It may be that this secondary pneumonia is usually less acute, less extensive, and consequently less severe, than primary pneumonia. Granting the fact, it by no means furnishes a reply to the fourth query; although, taken in connexion with the habitual non-inflammatory origin of tubercle, with the constitutional character of the disease, with the want of efficacy of antiphlogistics, and the superior utility of tonics and stimulants, in its treatment, it has no doubt assisted in giving rise to the opinion that inflammation is not a prominent source of mischief in phthisis.

If we analyse the particulars of the published cases in which an attack of pneumonia has been considered not to have proved prejudicial to the aftercourse of the pulmonary tubercles, we shall find some one of the following qualifying circumstances present. The cases occurred in hospital practice, and the patients only appeared no worse because they left the hospital immediately on their recovery from the acute attack. Or, the opinion has been founded on the exceptionable testimony of the patient's own history of his case. Or, the tubercles have been few, and in an early stage, and the constitution not gravely affected. Or, the inflammation has been limited to the base, the tubercles to the apex, of the lung inflamed. Or, the tubercles have been manifest only in one lung, and the pneumonia restricted to the other.†

But the inflammation of lung we have to consider in phthisis is rarely what would be styled an attack of pneumonia. Such attacks before the later stages are not customary; it is rather the repeated exacerbations of patches of chronic pneumonia, bronchitis, or pleurisy, from which, in its subdued creeping form, the patient is never entirely free. There is no evidence that these little inflammations are ever advantageous. There are abundant instances in which they are injurious. How many patients date the commencement, or first serious aggravation, of their consumption from some attack of what they call inflammation of the chest, influenza, pleurisy, sub-acute bronchitis, or pneumonia? Not that this proves the disease to have then originated, but it does prove that in the patient's own mind the thoracic inflammation bore an unfavourable relation to the phthisis. And the instances in private practice are innumerable in which an intercurrent exacerbation of previously slight pulmonic inflammation has clearly appeared to the medical attendant vastly to accelerate the destructive course of the tubercles. Add those far advanced cases in which an inflammation of the working remnant of lung proves the immediate cause of death, and we must conclude that, although in some cases of phthisis an acute attack of inflammation may seem to do no harm, yet there are far more in which its occurrence is fraught with ultimate danger.

A consideration of our means of diagnosis reminds us that we augur badly of the progress of pulmonary tubercles, entirely by the physical signs of inflammation and its consequences. Dulness and tubular breath-

* Walshe on Diseases of the Heart and Lungs, second edition, p. 517.

† See Louis' "most remarkable illustration," case 48, p. 383. Walshe's translation, Sydenham Society's edition; and another of his in Gazette des Hôpitaux, p. 134, 1846.

ing from inflammatory consolidation. Fine moist crackle, from inflammatory hypersecretion in the small bronchial tubes. Moist large sounds, gurgling, splashing, and the rest, from inflammatory destruction of lung-substance. Equally do the bad constitutional symptoms (hectic) point towards sympathy with a protracted inflammatory process.

From theoretical considerations, we should expect that when inflammation lingers around tubercles without any adequate exudation of plastic lymph, it must injure their chance of arrest. For it impairs the vitality of the inflamed texture; and this must be unfavourable to the sleep of tubercles, whose feeble vitality so largely depends on that of the adjoining tissues. There is greater heat around the tubercles; more chemical action going on. The tubercles are more likely to degenerate speedily; and speedy degeneration is synonymous with destructive softening. The inflamed tissue, irritated by the softening tubercles, is prone to undergo suppuration close around the tubercles, thus adding peripheric liquefaction to centric softening. There is now a vicious circle. The softening of the tubercle increases the inflammatory irritation; this in its turn quickens the softening. The fluid which results, unfit for absorption, irritates the vessels which refuse to imbibe it. Ulceration follows, and the work of destruction is fully established. And after ulceration it depends upon the amount of inflammation whether life is to be greatly protracted or speedily terminated.

Pathological observation, in support of this, teaches that all that is mischievous in the course of tubercles is inflammatory. That if no inflammation arises, or very little, tubercles have a natural tendency to soften so slowly that they soften safely, and undergo curative transformations. That, on the contrary, when attended by much inflammation, their softening is rapid, extensive, and dangerous.

If we now turn to the instances cited to prove that inflammation is curative in pulmonary tuberculosis, we find in every such case the inflammation has been merely of the plastic kind; that, namely, which occasions the effusion of a plasma which is fit for organization into a low form of fibrous texture. Now it will be admitted that this is the one form of inflammation which is closest to the process of normal nutrition. It is the first remove from health in the sliding scale of inflammation; it is that which occasions the smallest amount of irritation, whether local or constitutional; it is that which itself responds to the minimum of local irritation; and as a corollary to all this, it is that which is at once an effect and a proof of a sufficiently sthenic state of system, and a sufficiently small amount of local irritation.

It follows, considering what pulmonary tuberculosis is, that this is precisely that form of inflammation which in its pure shape is least common in phthisis; and which, when present, indicates an unusually favourable condition of both lung and constitution for the time being.

Does this benign plastic inflammation, when it affects a tuberculized lung, manifest itself by the ordinary symptoms of pneumonia? All the evidence goes to prove that it does not. It is a silent process, as much physiological as morbid, performed most perfectly when most unnoticed. Referring once more to the entozoic formations in the lungs of sheep, we may here see this plastic inflammation in its pure form unaffected by general cachexy.

It is reasonable to conclude that the nearer the inflammation which environs pulmonary tubercles in man can approach to this type, the better.

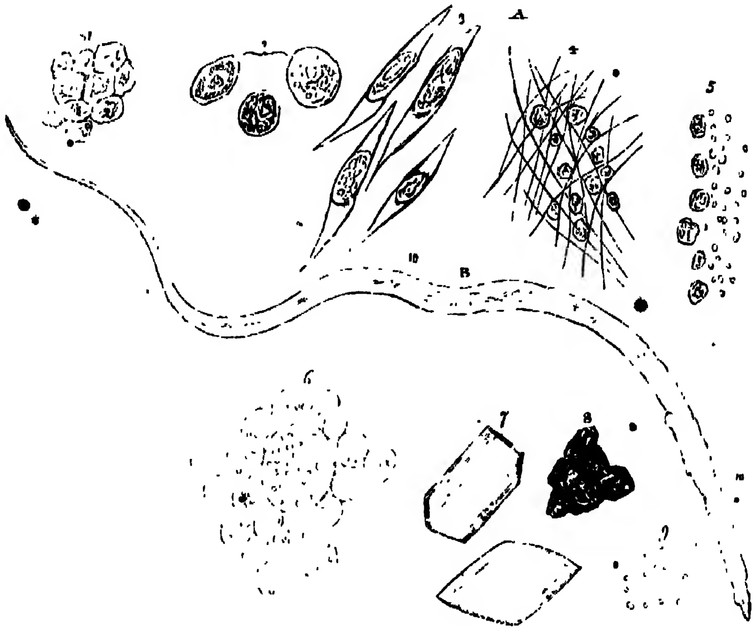

Fig. 31. Plastic Inflammation around Entozoic Formation in Lung of Sheep.

A. Wall of abscess, one-sixth of an inch thick; pink next to lung, pearly as it approached its lining membrane.
B. Contents of abscess, appearing to naked eye a greenish-yellow gluey jelly.

Proceeding from the lung through the wall into the centre of the abscess, we note in order—

1. Healthy lung-epithelium, not fatty.
2. Nucleated cells, forming the pink layer which separated lung from tougher portion of abscess-wall.
3. Large fibre-cells, forming outer layer of tough portion of abscess-wall.
4. Fibrillated network, with cells in its meshes.
5. Innermost layer of abscess-wall, made up of granule-cells and free fat, resting upon 4.
6. Mass of granule-cells, forming the bulk of the contents.
7. Crystals. 8. Amorphous calcareous matter.
9. Free fat. 10. Débris of worm.

Now there is nothing during the lifetime of the sheep to lead us to infer that it suffers pain, distress, or constitutional disturbance during the formation of this boundary of plastic inflammation around the nodules in its lungs.

We conclude that in phthisis, in exact proportion as we have external evidence of the existence of pulmonic inflammation, is such inflammation likely to depart from the plastic or good type. And consequently, that the only good inflammation is that of which both patient and physician are least conscious at the time.

And of such inflammation as declares itself by the ordinary signs and symptoms, in the words of Sir James Clark, "Pneumonic inflammation is one of the worst evils that can befal a patient already labouring under tuberculous disease of the lungs, as it never (*seldom*) fails to increase the

mischief, and frequently converts that which was latent, and might have long remained so, into active disease."*

Whatever of inflammation is good, then, is a secret and natural reaction to the local irritation of the tubercles; is always sufficiently great for its purpose; and in the grand majority of cases errs by being excessive and overstepping the bounds of plasticity. In no case, therefore, are we justified in anticipating positive benefit from the supervention of accidental attacks of inflammation. On the contrary, we shall always best promote the benign form of inflammation by calming down, when present, and avoiding all avoidable causes of, the irritative form. *If* we *can* master the inflammation around tubercles, we can save our patient. When the patient dies, it is invariably because inflammation has mastered art.

Throughout these observations, reference has been made to the chronic form of phthisis only—to that which, insidiously undermining the system, creeps on for some time before it unequivocally declares its presence. This form, I think, I have rendered it not improbable, commences in its local shape with degeneration of the epithelium of the air-vesicles. I am aware that in the most acute forms of pulmonary tuberculization each tubercle commences as an exudation, without previous fatty degeneration of epithelium. These cases do not fall under notice in this locality, and my personal knowledge of the microscopic appearances is founded on the examination of two instances only.† Each case at first simulated typhus fever. Each presented tubercular deposits on the cerebral meninges, on the peritoneum, and in the liver and spleen. In each the lungs were highly congested, but for the most part crepitant, and strewn throughout with pin-head tubercles, most of which were firm, but some of only semi-solid consistency. In each were seen glomeruli of various sizes, abundant; simple tubercle-corpuscles, some nucleated; compound tubercle-cells, either not present or rare; no characteristic fatty epithelium, either in the tubercle or in the air-vesicles adjoining.

In chronic tuberculization, it is not assumed that fatty degeneration of epithelium is the precursor of tubercle in any other organs than the lungs and the lymphatic glands.

Of the practical inferences which flow from the preceding survey of the natural history of chronic pulmonary tubercle, considered merely as a local deposit, leaving untouched its constitutional character, I may mention the following.

For the prevention of the disease.—If spontaneous chronic consumption do originate by slow structural degeneration of the lung antecedent to the formation of actual tubercle, in predisposed persons, every attention should be paid to fairly develop the threatened organ by due and sufficient functional exercise of it.

If chronic consumption do also sometimes originate in an attack of inflammation, care must be taken not to carry functional exercise to the extent of inducing irritation of the lungs. The predisposed individual should also carefully avoid all avoidable risks of accidental thoracic inflammation.

* On Pulmonary Consumption, p. 247. 1837.

† For one of which I was indebted to Dr. W. Budd, in 1849; for the other, to Dr. Brittan, in 1855.

For the management of the developed disease.—If when tubercles exist, whatever their stage, Nature is adequate to their cure, *provided there be time enough allowed*,—which implies that fatal allied disease elsewhere does not arise, that a check is put to the increase of tubercle, that inflammation is kept down, and the strength kept up,—for the successful treatment of every case of phthisis the indication is, to gain time and tone. The lungs must now be spared, by throwing extra work upon the liver and skin, care being taken to maintain these auxiliary organs of respiration in a fit state for duly discharging their vicarious increase of function. The signs of improvement need no comment. The criteria of want of success are only too familiar; a hot skin and quick pulse imply them all, for in phthisis, chronicity is comparative safety—acuteness is death.

Art. II.

The Rate of Pulsation and Respiration in Phthisis, and its Relation to Period of the Day, Posture, Temperature, &c. By Edward Smith, M.D., LL.B., L.R.C.P., Assistant Physician to the Hospital for Consumption and Diseases of the Chest, Brompton, &c.

The following investigation extended over a period of four weeks, excluding Sundays, and the subjects were fifteen men, in-patients at the Hospital for Consumption and Diseases of the Chest, Brompton, in various stages of phthisis. The inquiry embraced the rate of pulsation and respiration in each of the three postures of lying, sitting, and standing, and at two periods of the day—viz., at 8 A.M., before food was taken, and before the wear of the day had begun, and at 4 P.M.

The rate of both was taken in half minutes, and error was avoided by, 1st, counting from a long line on the dial; 2nd, re-counting when the number was doubtful; 3rd, entering each result instantly; 4th, maintaining silence; 5th, not engaging the patients' attention; 6th, taking the patients always in the same order; and 7th, rigid punctuality.

At five minutes to the hour all the patients lay down, and at the hour I took the rate of both functions in the lying posture on the first patient, then on a second, third, and fourth. The first, second, &c., patient sat up as I proceeded, and had occupied that posture some minutes, when I returned to them to note the rate in the sitting posture. So in like manner with the standing posture; and by dividing the patients into three sets, the inquiry was not burdensome to any one.

Two sources of error were troublesome. 1st, That of indistinct breath-motion, from its shallowness; and 2nd, the influence of cough, or of attempts to repress it; but care and experience overcame them. I ascertained that cough excites the respiration more than the circulation—viz., to about 10 respirations, and 10 to 15 pulsations per minute from one fit of coughing; but in a few seconds afterwards the effect on both functions had subsided. As, however, the cough was frequent, it was not wise to continue each inquiry longer than half a minute, and in case 90 it was not possible to continue it so long in the lying posture.

The patients, for other reasons, were fed apart from others, but no further interference with their habits occurred.

The observations were upwards of 3000, and were continued in each case, with 7 exceptions, during the month; one case died during that period, and four others continued a part of the month. The quantity of food was ascertained with the greatest accuracy, and the weight of each patient in his shirt was obtained every third morning at a fixed hour, and with the same quantity of excretions within the body, as far as could be pre-arranged. All had softened tubercle, and most of them had cavities, but all were able to take plenty of exercise and food, and to sleep well.

A series of diagrams are appended, which show, 1st, the temperature of the wards and external air, and 2nd, the rate of pulsation and respiration in each posture, and in the mean of all the postures, both in each case, and on the total average of the whole of the cases.

I shall first consider pulsation, and then respiration; and under each head shall discuss the rate, 1st, absolutely, and 2nd, as influenced by various disturbing causes.

Part I. — Pulsation.

The Rate of Pulsation in Phthisis, considered absolutely.

Although the patients were living from day to day under precisely the same circumstances, the diagrams show that in scarcely any instance was the rate the same in any posture at the same moment on two consecutive days. The variation was often 10, 15, or 20 pulsations. The extremes of the rate were 55 and 166 per minute, the larger being three times the lesser number, and even in the same case the variation was 73 pulsations.

The total average was 95·3, and the average extremes were 76·1 and 128·4, or an average difference equal to the whole rate in a healthy tall man. The cases varied greatly in this average, as is shown in the following table, in which they are arranged in the order of frequency of rate.

Table I.

No. of case	85	77	73	93	90	46	Total average.	80	79	107	88	58	95	69	75	51
Total average pulsation	128·4	112·5	104·6	99·8	97·5	96·9	95·3	94·9	92·7	92·6	91·3	89·5	86·4	84·1	83·2	76·1
		3 or ⅕.					7 or nearly ½.							5 or ⅓.		

Thus, the average rate in nearly half of the cases was between 90 and 100, whilst in one-fifth it was under 90, and in only one-third was it over 100. Only eight of the patients were under observation for the whole month, and of these one-third had the average rate below 90, and one-fifth above 100, and consequently the relation is nearly the same in the two classes of cases.

The rate is not dependent upon stage, nor upon the degree in which the system was implicated (although the case at the head of the list had the system more injured than any other), nor upon the degree of progress of the disease. Thus in the same disease, in every stage, and in every degree, there may be great differences in the rate of pulsation.

But before proceeding further, I purpose to consider each case in detail, so that the causes for the difference in the rate, both on the whole month and from day to day, may be sought for; and under each one will be stated his general condition, and that of the chest, with the progress as

evinced by weight, pulsation, and quantity of food. They will be considered in the order above given.

Diagram No. 2. CASE 85.—(Normal weight in clothes, 148 lbs.; vital capacity, 230 cubic inches. Hutchinson.) A pot-boy, aged twenty-three; 5 ft. 7 in. high; addicted to masturbation; ill ten months; much emaciated. Right lung: Dull down to sixth rib behind and before, with moist râles universally; minimum of mobility; only small patches of vesicular murmur, and very little respiration. Left lung: Dull extensively and chiefly behind; prolonged expiration, crepitation, lessened vesicular murmur, and lessened mobility. Heart, healthy. Respiration, 21 per minute (average). Thus, he breathed a little by one lung only, but as he objected to use the spirometer, we could not ascertain his vital capacity. (See Table II. p. 478.)

The weekly average rate of pulsation was 119·3, 124·1, 129·4, 140·6. His weight in pounds every third day from May 14th was [illegible]

NOTICE.

THE DIAGRAMS not having been completed by the artist in time for insertion with DR. SMITH'S paper, will be given in the next number.

Wine ,,	...	...	. .	...	...	...	2	2	2	2
Average pulsations	109	103	110	113	111	113	113	113	116	116

The weekly average rate was 110·8 and 114·2. His weight in pounds every third day, from May 30th, was 88, 87, 86½, 84¾, and 87. There was no complication, nor any marked change.

Diagram No. 4. CASE 73.—(Normal weight in clothes, 120 lbs.; v. c. 182 c. i. Hutchinson.) A compositor, aged twenty-two, 4 ft. 9⅝ in. high; sanguine temperament; ill ten months, and much emaciated. Right lung: Dull universally; cavity; prolonged expiration; lessened vesicular murmur. Left lung: Dull universally, with moist râles; prolonged expi-

TABLE II. (Case 85, p. 477.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	13	21	18	21½	22	23½	16¼	20¼	18¾	23¼	20¾	18½	21¼	23¼	21¼	16¾	20¾	22¼	15	17½	21¼	18	16
Meat ,,	...	...	4	4	4	4	4	3	4	4	4	4	3	4	4	4	3	3	3	2½	4	4	6	3
Fluids ,,	...	59	49	59	58	68	58	42	46	48	48	48	41	52	42	42	49	53	42	27	47	58	47	67
Ale ,,	...	...	8	8	8	8	8	...	8	8	8	8	10	10	10	10	6	10	10	...	10	10	10	10
Average pulsation	113	119	117	126	123	117	130	126	123	114	122	128	131	128	128	123	127	133	144	137	141	140	137	142

TABLE IV. (Case 73, pp. 477—8.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	18¼	20¼	20¾	17½	18½	16½	17	21	19½	15¼	16¾	16½	17½	19½	19¼	21¼	19	20	22¾	18¼	18½	18¾	17¼
Meat ,,	...	3½	3	3½	3	4½	2	2½	4½	3	2½	2	2	2½	2½	3	2¾	3	2¼	3	4	3½	3½	3
Fluids ,,	...	60	60	65	65	55	45	58	65	45	57	80	70	64	64	56	54	55	54	61	56	75	75	64
Ale ,,	...	8	8	8	8	8	8	8	8	8	8	8	10	10	10	10	10	10	10	10	10	10	10	10
Wine ,,	...	...	...	...	...	...	...	...	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Average pulsation	104	108	104	103	105	107	101	108	106	101	109	107	107	101	100	97	102	105	105	104	109	109	104	101

ration; lessened vesicular murmur; bronchial respiration. Heart, healthy. Respiration (average), 31. V. c. about 90 c. i. (See Table IV. p. 478.)

The weekly average rate of pulsation was 105·4, 104·4, 103·6, 105·2. His weight in pounds every third day was 86, 86¼, 85½, 86, 84¾, 85, 85, 84¾, 84¼, and 85½. There was no complication or marked change.

Diagram No. 2. Case 90.—(Normal weight in clothes, 162 lbs.; v. c. 230 c. i. Hutchinson.) A bookbinder, aged twenty-one; 5 ft. 8¼ in. high; ill two years; and lost two stones in weight. Right lung: Dull; cavity to third space, and another below; below this, no vesicular murmur; very little respiration; moist râles; minimum of mobility; great flattening. Left lung: Dull; flat; much less vesicular murmur and mobility; bronchial respiration; moist râles; prolonged expiration below the clavicle. Heart, healthy. Respiration (average), 25. V. c. from 80 to 86 c. i. (See Table V. p. 480.)

The weekly average pulsation was 97·8, 101·2, 97·8, 102·4. His weight in pounds every third day was 102¾, 103½, 103¾, 103½, 103½, 104, 104¼, 102¼, 102¾. There was a frequent and irritable cough, chiefly on lying down, but no marked change.

Diagram No. 3. Case 46.—(Normal weight in clothes, 155 lbs.; v. c. 232 c. i. Hutchinson.) A warder in a prison, aged thirty-four; 5 ft. 7¼ in. high; lymphatic temperament; fretful; ill eighteen months; lost two stones in weight. Right lung: Dull over clavicle; softening; small cavity; and prolonged expiration at the apex; prolonged expiration and lessened vesicular murmur below. Left lung: The same, but with lessened respiration and vesicular murmur. Respiration (average), 23. V. c. 100 c. i. This is one of the less extensively diseased cases. He was indisposed to make exertion, or to take much exercise.

Table VI.

Diet.	May			June							
	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	22¾	26	27	27	27	25½	28½	25½	27½	27	27
Fluids ,,	63	67	63	70	73	68	74	68	73	65	66
Porter ,,	10	10	10	10	10	10	10	10	10	10	10
Average pulsations	103	99	91	97	94	99	95	99	99	94	92

The weekly average pulsations were 98·5, 95·4. His weight in pounds every third day was 115, 113¼, 114¼, 114¼, 114¼. This is the only instance of diminished pulsation in the fourth week. There was no marked change.

Diagram No. 4. Case 80.—(Normal weight in clothes, 145 lbs.; v. c. 221 c. i. Hutchinson.) Servant, aged twenty; 5 ft. 5¼ in. high; spare and active; ill at intervals for years; but little emaciation. Right lung: Dull (moderately); small patches of softening. Left lung: Dull; great flattening; less mobility; cavity; and moist râles at the apex; cavity

TABLE V. (Case 90, p. 479.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	26	20	23¼	23¼	23½	27¼	20½	23½	27½	25½	23	21½	22	30½	26¾	24¾	34	30¼	34½	26¼	19¼	18½	18
Meat ,,	...	4	4	4	4	4	4	3	3½	3	3½	4	4½	4	4	4	4	5½	3½	4	5	2	2	4
Fluids ,,	...	42	37	48½	39	43	53	39	54	45	46	50	47	34½	36	47	44	45½	43	39	43	51½	43	39
Ale ,,	...	...	...	...	...	...	3	6	6	...	...	2	6	3	...	8	...	3	5	6	...	4	7	...
Wine ,,	...	3	2	2	2	3	3	1	..	1	...	...	...	1	...	1	1½	½	...	1	1	2	1	...
Average pulsation	97	98	94	94	103	104	102	97	96	102	104	104	98	100	93	96*	98	99	104	99	105	103	104	98

TABLE VIII. (Case 79, p. 481.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	23¾	28¾	28¾	27¾	21¾	27	27	24¾	24	23	12	9½	34½	37	37	37½	29½	24½	23½	24½	28	28	26½
Meat ,,	...	6	6	6	6	6	8	6	6	6	6	...	...	...	...	...	...	6	4	4	5	4	7	7
Fluids ,,	...	67	67	67	77	77	76	56	66	66	68	42	60	43½	55	49½	49½	55	75	60	60	75	65	64
Ale ,,	...	8	8	8	8	8	8	8	8	8	8	...	...	...	...	...	...	...	...	10	...	10	10	5
Wine ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	2	2	2	2	2	2	2
Average pulsations	91	92	92	96	98	96	93	91	94	90	95	93	94	89	88	86	85	83	87	95	96	100	92	101

under the second rib; less respiration, but yet much vesicular murmur. Respirations (average), 21. V. c. 100 c. i. This, like No. 46, was also a case of less extensive disease.

TABLE VII.

Diet.	May								June							
	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	31	25	27	26	22¾	31½	29	29¾	31¼	32¼	26½	27	32	29½	31½	29
Meat "	5	4	4	4	4	4¼	4	6½	5	5	4	4	5	4	8	4
Fluids "	56	66½	48½	66	70	74	68	72	70	63	50	63	74	50	40	63
Ale "	8	8	...	8	10	10	10	10	10	10	10	10	6	.	..	5
Average pulsations	93	86	89	93	92	99	101	90	99	96	95	102	96	93	103	94

The weekly average pulsation was 90·4, 97·2, and 97·2. His weight in pounds every third day was 98½, 98, 99½, 97¼, 99¾, 99½, 99¾. There was no complication, nor any marked change.

Diagram No. 2. CASE 79.—(Normal weight in clothes, 155 lbs.; v. c. 224 c. i. Hutchinson.) A boatman, aged twenty-two; 5 ft. 7¾ in. high; quiet, lymphatic, spare; ill two years, and emaciated. Right lung: Dull, chiefly over clavicle, but moderately over the whole lung; moist râles in the upper lobe; no vesicular murmur above, and but little below. Left lung: prolonged expiration universally; slight moist râles. Heart, healthy. Very much albumen, lithates and oxalates, in urine. Respirations (average), 21. V. c. 76 to 80 c. i. (See Table VIII. p. 480.)

The weekly average pulsation was 94·4, 93·1, 88·1, 95·4. His weight in pounds every third day was 109¼, 109¼, 110½, 111½, 110¼, 110, 110, 111¼, 111½, and 113. He suffered much from diarrhœa in the second and third weeks, which lowered the pulsation; and upon the whole became more feeble, and it is probable that the disease of the lung advanced somewhat.

Diagram No. 4. CASE 107.—(Normal weight in clothes, 145 lbs.; v. c. 203 c. i. Hutchinson.) A publican, aged thirty-five; 5 ft. 5⅛ in. high; nervous temperament; had drunk freely; ill two years, and was emaciated. Right lung: Dull universally; cavity in the whole of upper lobe; moist râles below the fifth rib; no vesicular murmur. Left lung: Dull to fifth rib; bronchial respiration; no vesicular murmur. Heart, healthy. Respirations (average), 25. V. c. 70 to 80 c. i. (See Table IX. p. 482.)

The weekly average pulsation was 94·7, 94·8, 89·6, and 91·5. His weight in pounds every third day was 99½, 99½, 101¼, 101¾, 99½, 99, 100¾, 102¼, 102¼, 102¾. Thus, although this was an extensively diseased and advanced case, he gained much flesh, and his pulsation declined. He had much sickness in the second and third weeks, and kept his bed for a few days.

Diagram No. 3. CASE 88.—(Normal weight in clothes, 148 lbs.; v. c. 216 c. i. Hutchinson.) A shipwright, aged forty-five; 5 ft. 6¾ in. high; active, nervous, spare; ill eighteen months; emaciated. Right lung: Dull, down to fifth rib; cavity down to fourth rib; moist râles; no vesicular mur-

TABLE IX. (Case 107, p. 481.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	25¼	22	22¾	24	26¾	20½	16	20	16	9½	11½	21	18½	24	26¾	22½	25	27	24½	21	19½	28	21½
Meat ,,	...	7	6	4	4	6	4	4	6	4	...	...	...	6	5½	7½	4	6	5½	6	7	6½	6	6
Fluids ,,	...	107	97	74	84	97	77	85	99	78	75	77	110	82	92	93	93	85	95	82	67	117	59	89
Porter ,,	...	8	8	8	8	8	8	8	8	16	8	8	10	10	20	20	20	20	20	20	20	40	20	20
Wine ,,	...	3	3	3	3	3	3	3	3	3	3	3	3	2	...	...	...	...	...	...	...	...	...	...
Average pulsations	96	95	94	86	101	95	94	94	95	94	94	96	90	88	91	85	87	92	87	87	94	92	94	93

TABLE X. (Case 88, p. 481.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	26¾	24¼	23¼	21½	21½	24¾	26½	22	23	22	18	19	25	22¼	24	18¼	22½	21	19½	18¾	21	22	22
Meat ,,	...	7	4	4	4	6	4	6	6	6	6	4	4	6	7	7	4	5	5	6	6	6	6	6
Fluids ,,	...	51	48	48	48	68	51	38	66	48	58	56	48	47	61	57	47	47	61	62	46	52	52	52
Porter ,,	...	16	16	16	16	26	20	16	16	16	16	16	20	20	20	20	20	20	20	30	20	20	20	20
Average pulsations	87	88	84	94	93	101	88	84	87	85	93	97	98	87	91	82	91	94	88	97	93	101	88	94

mur, and but little respiration below. Left lung: Less dulness over clavicle; prolonged expiration, and lessened vesicular murmur. Heart, healthy. Respirations (average), 21. V. c. 76 to 100 c. i. (See Table X. p 482.)

The weekly average pulsation was 88·6, 90·3, 92·5, 93·7. His weight in pounds every third day was 116¾, 117¼, 117¼, 115¾, 116, 116, 116, 117, 115, 115¾. He had the complication of troublesome hæmorrhoids from constipation. His pulse quickened somewhat, and although there was no marked change, the impression upon the mind was that the disease was somewhat advancing.

Diagram No. 3. CASE 58.—(Normal weight in clothes, 145 lbs.; v. c. 215 c. i. Hutchinson.) A carpenter, aged thirty-one; 5 ft. 5¼ in. high; lymphatic temperament; ill ten months; but little emaciated. Right lung: Dull universally; prolonged expiration; moist sound, on full inspiration, down to second rib; lessened vesicular murmur. Left lung: Dull; less respiration; prolonged expiration; pleuritic creaking. Heart, healthy. Respirations (average), 26. V. c. 100 c. i. There was extensive consolidation, with but very little destruction, and it was one of the less advanced cases.

TABLE XI.

Diet.	May											
	14	15	16	17	18	19	21	22	23	24	25	26
Solids (ounces)	...	29¾	30	33¼	30¾	33½	29½	31¼	...	32¾	32¾	26¾
Meat ,,	...	4	4½	6	6	6	5	6	...	8	5½	3½
Fluids ,,	...	76	86	96	96	96	86	56	...	76	56	76
Ale ,,	...	8	8	8	8	8	8	8	...	8	8	8
Average pulsations	88	93	88	89	95	92	91	94	90	82	87	88

The weekly average pulsation was 90·8 and 88·3. His weight in pounds every third day was 110½, 112¼, 113¼, 115½, and 114½. Thus he increased in weight, and his pulsation diminished, and upon the whole he improved.

Diagram No. 4. CASE 95.—(Normal weight in clothes, 148 lbs.; v. c. 216 c. i. Hutchinson.) A farmer, aged forty-three; 5 ft. 6⅛ in. high; ruddy; ill twelve months, and had lost a little flesh. Right lung: Large cavity, with flattening and immobility to third rib; no respiration at apex, and little below, to third rib; below fourth rib, prolonged expiration; clicks, and moist râles. Left lung: Only harsh breathing in the third intercostal space. Heart, healthy. Rose early; took much exercise. Respirations (average), 23. V. c. 130 c. i. This was the only instance having one lung sound. His system was almost uninjured. (See Table XII. p. 484.)

The weekly average pulsation was 84·9, 85·6, 86·8, and 88·6. His weight in pounds every third day was 135½, 136½, 135¼, 135¼, 135½, 134½, 136¾, 134¾, 134¼, 135¾. There was no complication, nor any change for the worse.

Diagram No. 2. CASE 69.—A Life Guardsman, aged twenty-six;

TABLE XII. (Case 98, p. 483.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	29¾	32¾	34½	37	38	29½	27½	23½	37	33½	27½	31¾	32	32	34¼	30	30	32	30	31¼	33½	42½	35
Meat ,,	...	4	4	4	4	6	4	4	4	5½	8	4	7¾	6	6	8¾	6	8	10	7½	6	8	8	6
Fluids ,,	...	56	56	76	76	56	76	56	76	66	76	76	80	82	62	77	62	52	79	59	72	74	85	80
Ale ,,	...	8	8	8	8	8	8	8	8	8	8	8	10	10	10	15	10	10	7	7	10	...	3	10
Average pulsations	79	85	88	88	83	94	83	85	85	86	86	89	87	82	86	91	91	88	88	86	89	89	88	90

TABLE XIII. (Case 69, pp. 183—5.)

Diet.	May																June							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9
Solids (ounces)	...	43½	43½	40½	43¾	43½	49	42¾	48¼	46	44½	43½	45	45½	47	47½	34¼	...	37½	20	36½	38¼	38¼	36
Meat ,,	...	9	9	6	6	6	10	6	11	8	6	6	6	6	6	6	2	...	6	2	7½	11	7	6
Fluids ,,	...	127	129	119	117	117	97	126	66	126	106	106	122	80	106	86	79	...	116	101	108	74	90	80
Ale ,,	...	8	8	8	8	8	8	8	8	8	8	8	20	30	30	20	20	...	20	40	34	20	20	20
Average pulsations	77	79	77	85	85	82	78	85	78	78	76	86	79	81	84	80	91	98	90	91	89	87	84	85

6 ft. $1\frac{3}{4}$ in. high; ill twelve months, and had lost flesh, although still weighing twelve stone. Right lung: Bronchial respiration, and greatly lessened vesicular murmur to fifth rib. Left side: Dull universally; very little respiration or vesicular murmur; clicks. Heart, healthy. Respirations (average), 16. V. c. lessened during the month from 150 to 137 c. i. This was one of the less advanced and less injured cases. (See Table XIII. p. 484.)

The weekly average pulsation was 81·4, 81·, 85·9, and 88·2. His weight in pounds every third day, from May 14th, was $167\frac{3}{4}$, $169\frac{3}{4}$, 172, $171\frac{3}{4}$, $172\frac{1}{2}$, $173\frac{1}{2}$, 174, 169, $172\frac{1}{4}$, 171. Thus his weight increased until the end of the third week, when he took cold, and had fever, cough, loss of appetite and flesh, and his left lung then presented moist râles extensively. He gained ground at first, but more than lost it afterwards, and his disease undoubtedly progressed.

Diagram No. 3. Case 75.—(Average weight in clothes, 145 lbs.; v. c. 209 c. i. Hutchinson.) A servant, aged twenty-five; 5 ft. $5\frac{1}{2}$ in. high; very lymphatic and sluggish temperament; ill twelve months, and was emaciated. Right lung: Dull, and humid râles to second rib; pleuritic sounds below; very little vesicular murmur. Left side: prolonged expiration, and lessened vesicular murmur universally; pleuritic sounds. Heart, healthy. Respirations (average), 17. V. c. 130 c. i. Thus the diminution of vital capacity and the extent of mischief were less than in almost any other of the cases.

Table XIV.

Diet.	May											
	14	15	16	17	18	19	21	22	23	24	25	26
Solids (ounces)	...	25	22	21	20	21	22	26	20	24	20	20
Meat ,,	...	6	4	4	5	4	5	6	4	4	4	4
Fluids ,,	...	59	59	69	59	59	67	57	57	57	57	57
Porter ,,	...	8	8	8	8	8	8	8	8	8	8	8
Average pulsations	89	83	81	76	82	80	84	88	79	83	82	88

The weekly average pulsation was 82·1 and 84·3. His weight in pounds every third day, from May 14th, was $100\frac{1}{2}$, $100\frac{1}{4}$, $100\frac{1}{2}$, $100\frac{3}{4}$, $101\frac{1}{4}$. There was a remarkable diminution of pulsation in the 1st week, and the increase in the second, which was found in most of the cases; but there was nothing remarkable in the progress of the case.

Diagram No. 4. Case 51.—(Average weight 139 lbs.; v. c. 188 c. i. Hutchinson.) An omnibus conductor, aged fifty-one; 5 ft. 4 in. high; ill thirteen months, and much emaciated. He passed large quantities of renal casts, and some albumen. Right lung: Dull to second rib; prolonged expiration, and moist râles, on deep inspiration, to fifth rib; very little vesicular murmur. Left lung: Dull on the clavicle, and few humid râles to the second rib. Heart, healthy. Respirations (average), $22\frac{1}{2}$. V. c. 120 c. i. Thus, except for the renal complication, the case was not greatly advanced, nor very extensive.

TABLE XV.

Diet.	May					
	14	15	16	17	18	19
Solids (ounces)	...	$14\frac{1}{2}$	$13\frac{1}{4}$	$15\frac{1}{4}$	$15\frac{3}{4}$	$14\frac{3}{4}$
Meat "	...	4	...	...	...	...
Fluids "	...	79	87	97	107	107
Ale "	...	8	8	8	8	8
Average pulsations	93	81	71	71	72	68

The weekly average pulsation was 76·1. His weight in pounds every third day, from May 14th, was $86\frac{1}{4}$, $84\frac{1}{2}$, and $86\frac{1}{4}$. This case shows a diminution of pulsation, in one week, of the most remarkable character; and one due, probably, to emotional influences.

The foregoing analysis will enable us to determine, in each case, the stage of the disease, its extent, the degree and rapidity of progress, and the effect of changes in the daily quantity and quality of food; and thus we should be further enabled to determine various questions in reference to pulsation and respiration.

The following comprehensive table contains the elements of the inquiry (deduced from the foregoing analysis) in reference to each case, the cases being arranged in the order of *probable* extent of disease, beginning with the most extensive. (See Table XVI. p. 487.)

There is throughout the whole table a want of entire uniformity; but the cases may be divided into two categories of extensive and limited disease, by drawing a line after No. 107. There is some doubt as to the position of the following case, or the seventh on the list; but as one lung was sound, and as I have remarked that the system seemed to suffer less when one lung only was diseased than when both lungs were affected to a less extent, and as he had quite the aspect of a healthy man, I have included him in the lower division.

From this table the following deductions may be made:

1. In the upper category, viz., Nos. 90, 88, 73, 77, 85, and 107, the disease was very extensive and advanced, and much more so than in the lower category.

2. The general system was much more implicated in the cases of the upper than of the lower category.

The more extensive and advanced cases of disease differed from the others in the following particulars:

1. Fewer patients were of the non-excitable and sluggish temperament.

2. The existing vital capacity was less.

With one exception (No. 79) the less advanced cases had a vital capacity of 100 c. i. and upwards.

There are two modes of estimating the value of any existing vital capacity—1st, as above, by the number of cubic inches remaining absolutely; and 2nd, by regarding the deficiency between the existing and

Table XVI. *Showing the relation of the degree in which the lungs were diseased to various questions, and especially of the pulse and respiration.*

—		No. of Case. 90	88	73	77	85	107	95	46	80	69	79	58	75	51
Consolidation	right	very great	v. great	very great	great	v. great	very great	mod.	little	little	little	great	great	moderate	mod.
	left	extensive	mod.	very great	very great	great	great	...	moderate	mod.	great	little	great	very little	little
Destruction	right	very great (cav.)	v. great (cav.)	cav	mod. extensive.	mod. extensive	very great (v. l. cav.)	v. great (lt. cav.)	mod. (cav.)	little	...	mod.	very little	little	little
	left	mod.	...	mod. extensive.	(cav.)	mod. extensive.	...	...	mod. (cav.)	mod. large cavity.	mod.	...	...	...	v. little
Height		5 8¼	5·6¼	4·9⅗	5·5½	5 7	5·5⅜	5·6⅓	5·7½	5 5¼	6·1¾	5· 7¾	5·5½	5·5⅓	5·4
Weight		7·1½	8·4½	6 2	6 4	6·6	7 2	9 9½	8·3	7·	12·	7·11¼	8·	7·2½	6·2
Temperament		medium	v. excit.	v. excit.	excit.	excit.	v. excit.	ordinary	not excit.	ordinary	ordinary	excit.	not excit.	v. sluggish	ord.
Activity of body		medium	active	active	quiet	active	active	v. active	slow	active	active	rather slow	rather slow	very slow	rather slow
Vital capacity in cubic inches		83·	76–100	90	(very small)		70–80	130	100	100	130–140	80	100	130	120
Pulsation. Total average	Respiration	24·7	18·1	31·	29·7	20·6	24·9	22 6	22·7	20·6	16·	20·6	25·6	17 as low at 11	22·4
	Pulsation	97·5	91·3	104·6	112·5	128·4	92 6	86·4	96·9	94·9	84·1	92·7	89·5	83·2	76·1
Difference between extremes		39	58	42	44	73	52	51	52	57	38	50	43	39	49
Difference of daily average		12	17	9	7	31	14	15	12	17	?	18	13	11	15
Increase or decrease of weekly averages		incr. 4·8	incr. 5·1	stationary	incr. 3·4	incr. 21·	decr. 3·2	incr. 3·7	decr. 3·1	incr. 6·8	incr. 6·8	incr. 1· variable	decr. 2·5	incr. 2·2	dec.
Progress		none	mod.	none	none	great	moderate	none	mod.	none	mod.	mod.	none	none	none
Time under observation		month	month	month	nearly fortnight	month	month	month	nearly fortnight	nearly 3 weeks	month	month	fortnight	fortnight	week

the normal vital capacity. If we adopt Dr. Hutchinson's results, the deficiency will be indicated in the following table:—

TABLE XVII. *Showing the cases arranged in the order of diminished vital capacity.*

Case.	Healthy standard. Cubic inches.	Existing vital capacity. Cubic inches.	Amount of diminution. Cubic inches.	Amount of diminution relative to health. Cubic inches.
90	239	80 to 86	153	more than $\frac{3}{5}$ths
79	224	80	144	more than $\frac{3}{5}$ths
88	206	76 to 100	126	$\frac{3}{5}$ths
107	203	80	123	$\frac{3}{5}$ths
46	232	100	132	$\frac{3}{5}$ths
80	221	100	121	$\frac{4}{7}$ths
58	215	100	115	more than $\frac{1}{2}$
73	182	90	92	$\frac{1}{2}$
51	188	120	68	more than $\frac{1}{3}$rd
75	209	130	79	ditto
95	216	130	86	$\frac{2}{5}$ths

No admeasurement of the vital capacity could be made in cases 85 and 77.

If all the elements in this inquiry could be determined with accuracy, there can be no doubt as to the preference which ought to be given to this last mode of determining the question. The arrangement in the above table is not precisely that determined by the table preceding.

3. The average respiration was quicker, as 24·8 in the former to 20·9 in the latter, notwithstanding the exceptional low state of respiration in case 88.

4. The average pulsations were greater, as 104·5 in the former to 88·1 in the latter.

5. The extremes of pulsation, both absolutely and on the average, were somewhat greater.

It would be interesting to determine (in relation to these deductions) the value of very extensive consolidation, as opposed to less extensive consolidation combined with destruction; and that of one lung greatly diseased with the other sound, as opposed to less extensive disease affecting both lungs. The subject is one of insuperable difficulty, from the impossibility of measuring these conditions with accuracy; but I am of opinion that the system suffers more with moderate consolidation and destruction than with more extensive consolidation alone, and with both lungs moderately diseased than with one more extensively diseased and the other perfect.

6. There is no constant relation between lessened vital capacity, or frequency of pulsation (each considered apart), and the variations of respiration and the difference between the two extremes.

DISTURBING INFLUENCES.

A. *Period of the Day.*

The examinations were made at eight A.M. and four P.M. The total average of 792 morning and 714 evening examinations was 91·2 pulsa-

tions for the morning and 98·4 for the evening. The average evening excess was thus seven pulsations, but it varied from nothing to fourteen pulsations. The absolute extremes of pulsation were, in the morning 65 and 143·6, and in the evening 70 and 152.

The following table exhibits the averages in each case, arranged in the order of amount of evening excess.

TABLE XVIII.

Case	73	46	88	77	80	58	93	Total aver.	107	85	51	79	90	75	69	95
Aver. pulsation:																
Morning	96·6	90·2	85·2	106·6	89·4	85·7	99·8	91·2	89·2	125·	73·1	89·8	97·1	80·8	82·1	87·1
Evening	110·3	103·7	97·3	118·4	100·4	93·5	103·6	98·4	96·	131·6	79·	95·6	102·5	85·7	85·6	85·6
Evening excess	13·7	13·5	12·1	11·8	11·	7·8	7·6	7·2	6·8	6·6	5·9	5·8	5·4	4·9	3·5	−1·5

Thus, in only one case was there no evening increase, and that was an active ruddy farmer, with one lung nearly sound. The remaining fourteen are divisible into two classes, one of which has an average increase above, and the other below, seven pulsations.

This evening excess is commonly associated with, or dependent upon, two conditions—1. Extent of lung disease; 2. Frequency of pulsation.

1. *Relation with extent of Lung Disease.*—This is seen by referring to the order of the cases in the above table with that of Table XVI., and comparing the upper half of each table with each other. Nos. 73, 88, and 77 are found in both tables, and to these must be added No. 93, who was so much diseased that he died from pneumo-thorax during the inquiry. Thus four out of seven cases agree in great extent of disease and great evening excess of pulsation. Nos. 46 and 80 in the last table appear exceptional, and perhaps that may be explained by stating, that although the disease was not extensive, both the lungs were diseased, and in each case there was one or more cavities. No. 90 was much diseased, and yet appears at the middle of the lower half of the table, so that the rule does not always apply.

2. *Relation with Rapidity of Pulsation.*—The relation seems to be in the same degree as that of rapidity of pulse to extent of disease. Thus the totals of the average pulsations in the 7 upper cases in the last table, or those having an evening excess of more than 7 pulsations, are greater than those of the 7 below, as follows.

	Morning pulsation.	Evening pulsation.
7 upper cases	653	727·2
7 lower cases	637	676·

Had it not been for the exceptional position of case 85 in the lower list, this difference would have been very striking.

There are also exceptions to this law. Thus No. 88 in the upper list has not a rapid pulsation, whilst No. 90 has rapid pulsation, and is in the lower list. Our inability to measure with absolute accuracy the extent of mischief may perhaps be the explanation. The converse of the rule does not hold.

TABLE XIX. *Showing the weekly evening excess of pulsation.*

No. of case.	First week. May 15 to May 19. Pulsation. Morn.	Even.	Evening excess.	No. of days of evening excess.	Second week. May 21 to May 26. Pulsation. Morn.	Even.	Evening excess.	No. of days of excess.	Third week. May 28 to June 2. Pulsation. Morn.	Even.	Evening excess.	No. of days of excess.	Fourth week. June 4 to June 9. Pulsation. Morn.	Even.	Evening excess.	No. of days of excess.	Total Pulsation. Weeks with evening excess.	Days with evening excess.
73	98·	112·8	14·8	6/6	99·1	109·	10·9	6/6	94·1	113·2	19·1	5/5	95·2	115·3	20·1	6/6	*all	23 all
88	85·3	91·9	6·6	5/6	84·6	96·	12·4	5/5	84·6	100·4	15·8	5/5	86·4	101·	11·6	6/6	"	$\frac{21}{22}$
85	115·8	122·7	6·9	5/6	123·1	125·2	2·1	4/6	124·6	134·2	9·6	5/5	136·8	144·4	7·6	6/6	"	$\frac{22}{23}$
46	...	...	...	...	...	...	...	...	91·4	105·8	14·4	4/4	89·1	101·6	12·5	6/6	"	10 all
93	96·	103·6	7·6	4/5	...	...	...	...	...	...	...	...	...	...	...	...	"	$\frac{4}{5}$
77	...	...	...	...	...	...	...	...	104·2	117·5	13·3	3/3	109·	119·4	10·4	6/6	"	9 all
80	...	...	...	...	84·3	96·6	12·3	4/4	92·5	102·	9·5	5/5	91·6	102·8	11·2	6/6	"	15 all
58	86·5	95·1	8·6	4/6	85·	91·9	6·9	4/5	...	...	...	...	...	...	...	...	"	$\frac{8}{11}$2 =
107	90·	99·5	9·5	5/6	91·	98·6	7·6	5/6	88·3	91·	2·7	4/5	87·8	95·2	7·4	5/5	"	$\frac{19}{22}$2 =
51	73·1	79·	5·9	5/6	...	...	...	...	...	...	...	...	...	...	...	...	"	$\frac{5}{6}$
79	89·	99·8	10·8	6/6	90·	96·	6·	4/6	89·6	86·6	—3·	2/5	90·6	100·2	9·6	5/6	3/4	$\frac{17}{23}$
90	93·6	102·	9·4	6/6	99·7	102·7	3·	5/6	95·6	100·2	4·6	3/5	99·6	105·1	5·5	5/6	all	$\frac{19}{23}$
75	80·5	83·7	3·2	5/6	81·1	87·5	6·4	6/6	...	...	...	...	...	...	...	...	"	$\frac{11}{12}$
69	81·1	81·7	6·	3/6	80·8	81·1	—·7	3/6	81·9	88·9	7·	4/4	84·7	91·7	7·	4/6	"	$\frac{14}{22}$
95	84·6	85·2	6·	4/6	86·7	84·6	—2·1	4/6	89·2	84·4	—4·8	2/5	88·	89·2	1·2	4/6	2/4	$\frac{14}{23}$

3. Activity of habit does not account for the evening excess, for No. 46 was sluggish, and is yet found in the upper class; and Nos. 69 and 95 were very active in and out of doors, and yet one is in the lower class, and the other has no excess.

4. This evening excess corresponds somewhat with the temperature of the day, and it will be shown that temperature does increase pulsation when acting at considerable intervals, as of a day.

5. *The Relation of Evening Excess of Pulsation to the Progress of the Disease.*—To this end it is needful to examine the excess from week to week, and also from day to day, as is effected in Table XIX. (p. 490).

Thus every case (except two, Nos. 79 and 69) having a total excess had an excess in each week. No. 95, which had no total excess, had an excess in two of the four weeks. In 2 cases the excess was notably lessened, and in 1 it was increased. Thus No. 79 had a diarrhœa, and No. 107 had vomiting, and in both the pulsation was lowered and the evening excess lessened; whilst No. 69 had an attack of inflammation, and the pulsation and evening excess were increased.

There is a general relationship between increasing and decreasing pulsation and increase or decrease of the evening excess, and especially between the evening increase or decrease and the excess; but until the average pulsation amounts to 90 per minute, the evening excess is but small. The one is not a measure of the other.

Apart from this change in pulsation, there does not appear to be any relation between the increase of the evening excess and the progress of the disease.

B. *Posture of the Body.*

This influence is great, and capable of tolerably exact definition.

On the total average in 1500 observations the pulsation was as follows: lying, 87; sitting, 95·5; and standing 104·1; showing an excess of sitting over lying of $8\frac{1}{2}$ pulsations, and of standing over sitting of 8·6 pulsations, or a total excess of 17 pulsations in the standing over the lying posture. The excess in the sitting is just midway between that of the standing over the lying posture, and might therefore be the one to be selected by writers when describing pulsation. The extremes of pulsation in the three postures were very great. Thus lying, 55 and 138; sitting, 62 and 150; and standing, 75 and 166. The greatest excess recorded in one day was 29 in the sitting over the lying posture, 32 in the standing over the sitting, and 44 in the standing over the lying posture. Thus, in some cases of phthisis the mere excess of pulsation from posture of body much exceeds the half of the total pulsations in health.

Table XX. (p. 492) shows the increase in each of the cases, the cases being arranged in the order of greatest increase in the standing posture.

Thus, in only one trifling instance was there no excess, and that instance is remarkable as offering the precise number of pulsations in the two postures of lying and sitting. The diversity was very great—viz., from 8 to $23\frac{1}{3}$ pulsations in the standing over the lying posture. The pulsation was highest in the standing posture in every case. The amount of increase in the sitting over the lying posture was greater than in the standing over the sitting posture in 11 of the 15 cases, as 130·6 are to 125·9. The exceptions were Nos. 79, 58, 90, and 69.

TABLE XX. *Showing the average increase of pulsation in each case and in each position.*

Number of Case	88	79	95	85	77	75	93	58	46	80	107	51	73	90	69
Excess:															
Sitting over lying	14·6	9·6	11·	11·	12·1	10·2	7·4	8·	9·3	9·7	8·2	7·5	5·5	3·4	...
Standing over sitting...	8·7	12·7	10·3	9·8	8·4	9·2	11·6	10·5	8·3	7·8	6·3	6·1	4·9	5·7	8·2
Standing over lying ...	23·3	22·3	21·3	20·9	20·5	19·4	19·	18·5	17·6	17·5	14·5	13·6	10·4	9·6	8·2

The variation in this excess from posture is not accounted for by age, temperament, amount of lung disease, frequency of pulsation, or height of body, all of which comparisons may be made by reference to the preceding tables.

On the weekly averages, the pulsations in the sitting posture exceeded those in the lying, except in the third week in No. 69. The amount of the excess varied from 1 to 17·6 pulsations, and in the same case in consecutive weeks the increase varied sometimes to the extent of nearly 8 pulsations, whilst in other cases it was absolutely stationary. The increase in the standing over the lying and sitting postures was universal, and had extremes so wide as 2·3 and 15·9 pulsations in the latter, and 7·1 and 28·1 in the former, whilst the weekly variation was from 0· to 10 pulsations. Thus the amount and progress of variation in one position is no guide to determine the like in other positions, and no case exhibited any peculiar characteristic equally in all the positions.

The average pulsation in the lying posture was almost identical with the mean of all the postures. Thus, in three instances it was identical to a decimal point, and in twenty-eight of forty-five weeks the variation was not more than 1 pulsation. In one-half of the cases the pulsations in the sitting posture were slightly higher than the mean pulsations, and chiefly in the cases having the greatest excess in the standing posture.

The daily returns present much greater diversity. In only one case (No. 46) were the increased pulsations in the sitting and standing postures found in every day's examination. Of a total of 502 observations, 443 (or seven-eighths of the whole) had an excess in the sitting over the lying, and 469 an excess in the standing over the sitting postures. Thus, the excess in the standing is a little more constant than in the sitting posture.

The Influence of Period of the Day over this Increase.—This influence is much greater than could be inferred by reference to the disturbing causes of the day, such as exertion, anxiety, food, and temperature. The common effect was to increase the pulsations, and Table XXI. (p. 493) shows the number of times in which that increase was observed in each posture and in each case, compared with the total number of observations in each case.

Thus, in only 1 case did the evening pulsations in all the positions exceed those of the morning. In the lying posture, 4 obeyed the rule in every examination, whilst there were only 2 in the sitting and 1 in the standing posture. Regarding the whole as one series of 238 observations, 208 had an evening excess in the lying, 201 in the sitting, and 173 in

TABLE XXI. *Showing the total number of observations in each case, and the number of times in which an increase was observed in each posture.*

Number of Case	90	95	79	73	85	88	69	107	80	75	58	46	77	51	93
Lying	17	11	16	23	20	22	15	20	14	11	10	10	9	5	5
Sitting	17	13	17	23	19	21	13	18	13	11	10	10	8	4	4
Standing	13	7	16	23	12	20	14	17	14	6	6	9	8	4	4
Number of evening observations	23	23	23	23	23	22	22	22	15	12	11	10	9	6	5

the standing posture. Thus, whilst the rule is established, it is much less frequently obeyed in the standing and sitting postures; and this is best illustrated by case 95, in whom, on the total average, there was no evening excess.

What is the reason for the lessened constancy in the evening increase in the standing posture? In the morning the heart is vigorous, and enabled to propel the blood in opposition to gravity; but as the day wears away the body wears too, and the heart's action in a measure fails, and the failure will be first seen in that position which calls for the greatest power of the heart—viz., the standing posture. Hence probably this might be employed as a test of the progress of hourly wear and tear.

The extent of this increase on the average and in the extremes in each case is given in Table XXII. (p. 494.)

Thus, in the lying posture the average excess varied from 2 to 22 pulsations, in the sitting posture from 1 to 17 pulsations, and in the standing posture from 0 to 12 pulsations. The relative excess of the sitting and standing postures is less than in the morning, and this may be owing either to a disproportionate increase in the lying or decrease in the standing postures. If we add together all the pulsations in each position for the morning and the evening separately, and note the difference (as in the following table), we shall find that, taking the sitting posture as a medium, it is chiefly owing to the lessened elevation in the standing posture.

TABLE XXIII.

	Morning.	Evening.	Difference.
Total excess of sitting over lying	148·3	107·9	40·4
,, ,, standing over sitting	114·9	102·7	42·2
,, ,, ,, lying	293·2	200·6	82·6

The same fact is well illustrated in the next table, which shows the amount of morning excess in the increase in the standing posture, the cases being arranged in the order of the evening excess of pulsation.

TABLE XXIV.

Case	79	88	95	75	93	77	58	80	85	46	107	51	90	69	73
Excess, even.	22·	21 6	19 8	16 8	15·9	15·8	14·7	13·8	13·4	12 5	12·1	9 6	6·5	6·5	5·7
,, morn.	22·5	25·1	22·8	21 9	22·	25·2	22·2	12·1	24·4	22·7	16·8	17·6	12·8	9 9	15·2
Incr. of morn. ex. over even.	·5	3 5	3	5·1	6·	9·4	7·5	...	11·	10·2	4·7	8·	6·3	3·4	9·5

TABLE XXII. *Showing the average and extreme pulsation in each case in the morning and evening, and in the three postures.*

Case.	—	Total weekly average.	Lying. Med.	Lying. Extrem in one day.		Sitting. Med.	Sitting. Extrem. in one day.		Standing. Med.	Standing. Extrem. in one day.		Excess of: Sitting over lying.	Greatest in one day.	Standing over sitting.	Greatest in one day.	Standing over lying.	Greatest in one day.
85	Morn.	125·	113·1	93	134	124·6	104	142	137·5	112	162	11·5	19	12·9	32	24·4	42
	Even.	131·6	122·1	110	138	132·7	114	150	139·5	120	166	10·6	20	6·8	28	17·3	44
77	Morn.	106·6	93·1	90	98	108·8	102	118	118·3	111	122	15·7	24	9·5	13	25·2	28
	Even.	118·4	110·3	105	114	118·8	114	125	126·1	122	134	8·5	14	7·3	12	15·8	23
73	Morn.	96·6	88·9	82	90	96·8	81	111	104·1	98	114	7·9	18	7·3	23	15·2	22
	Even.	110·3	110·5	106	122	113·6	104	122	116·1	100	129	3·1	10	2·5	10	5·6	16
90	Morn.	97·1	90·7	78	104	97·	86	110	103·5	92	112	6·3	16	6·5	18	12·8	20
	Even.	102·5	100·	83	110	101·6	95	108	106·5	96	117	1·6	25	4·9	14	6·5	11
93	Morn.	96·	85·8	78	92	94·6	90	100	107·8	98	116	8·8	13	13·2	24	22·	32
	Even.	103·6	96·1	92	108	102·	96	116	112·	98	130	5·9	8	10·	16	15·9	32
46	Morn.	90·2	78·5	68	85	90·9	38	94	101·2	94	106	12·4	24	10·3	16	22·7	32
	Even.	103·7	97·5	89	100	103·8	96	112	110·	102	120	6·3	8	6·2	12	12·5	18
80	Morn.	89·4	78·5	65	91	90·4	80	104	99·6	90	110	11·9	21	·2	16	12·1	32
	Even.	100·4	93·2	79	112	100·7	94	114	107·	97	122	7·5	17	6·3	15	13·8	18
79	Morn.	89·8	79·3	72	98	88·4	74	104	101·8	91	110	9·1	29	13·4	28	22·5	30
	Even.	95·6	85·	74	96	95·	81	118	107·	94	102	10·	24	12·	30	22·	41
107	Morn	89·2	80·	73	90	90·4	81	98	96·8	85	106	10·4	20	6·4	18	16·8	33
	Even.	96·	90·1	80	98	96·	87	116	102·2	93	114	5·9	18	6·2	15	12·1	22
88	Morn.	85·2	71·6	64	80	86·7	77	98	96·7	85	112	15·1	21	10·	23	25·1	40
	Even.	97·3	85·4	74	109	99·6	82	118	107·	90	132	14·2	19	7·4	18	21·6	36
58	Morn.	85·7	77·6	65	88	86·5	80	93	99·8	83	104	8·9	15	13·3	19	22·2	30
	Even.	93·5	86·1	80	94	93·1	84	102	100·8	92	108	7·	11	7·7	16	14·7	18
95	Morn.	87·1	76·	57	83	86·6	74	96	98·8	84	108	10·6	17	12·2	21	22·8	31
	Even.	85·6	76·2	68	88	87·7	78	96	96·	86	106	11·5	18	8·3	17	19·8	30
69	Morn.	82·1	78·6	66	97	79·3	68	97	88·5	80	102	7·	8	9·2	27	9·9	24
	Even.	85·6	84·1	70	98	83·4	70	92	90·6	75	104	—·7	9	7·2	20	6·5	17
75	Morn.	80·8	69·9	63	80	80·6	78	96	91·8	76	100	10·7	19	11·2	16	21·9	35
	Even.	85·7	76·8	64	92	86·5	74	96	93·6	84	102	9·7	18	7·1	12	16·8	24
51	Morn.	73·1	61·5	55	86	72·8	62	92	82·1	76	98	8·3	19	9·3	14	17·6	21
	Even.	79·	73·5	62	84	80·3	70	96	83·1	76	104	6·8	12	2·8	18	9·6	20

In only one case was the evening increase equal to that of the morning. The cases in which the morning excess was very little were for the most part the less advanced cases—viz., 80, 79, 95, 88, and 69; and those in which it was considerable were for the most part greatly advanced—viz., 85, 46, 73, and 77. Thus it appears that when the disease is greatly advanced, and the vital capacity at a minimum, the rate of pulsation is less amenable to disturbing influences, although the total pulsations are more numerous in the evening than in the morning. There are many exceptions to this rule.

The combined effect of posture in all the cases with the amount of evening excess, is given in Table XXV. (p. 495).

Thus the highest average numbers and the highest extremes, in all the positions, is found in the evening; but the difference in pulsation from

TABLE XXV.

	Morning.	Evening.	Excess of Evening.
Mean pulsation in all the cases.	91·2	98·4	7·2
Lying	81·7	92·4	10·7
Extremes	55 } 134 }	62 } 138 }	
Sitting	91·9	99·6	7·7
Extremes	62 } 142 }	70 150	
Standing	101·8	106·5	4·7
Extremes	76 } 162 }	95 166	

position, and the difference between the extremes, are less in the evening. The morning increase in the sitting and standing postures is 10 each, or a total increase of 20 pulsations; whilst in the evening it is only 7·2 in the sitting, and 6·9 in the standing, or a total of 14 pulsations.

C. *Influence of Temperature.*

This is shown upon diagram No. 5. In the lower part are represented the pulsations in the three positions of the body, with the temperature of the wards at eight A.M. and four P.M. In the upper part are the total pulsations for each day of the month, with the mean temperature of the wards and of the external air, as also the degree of dryness of the air at Greenwich. The totals of the three postures have been used, in order to show the daily differences more readily.

The following facts may be obtained from the upper part of the diagram:—

1. The total pulsations increased from 539 to 627 throughout the month, from May 14th to June 9th. The weekly averages were 558, 563, 586, and 609, and consequently there was a weekly increase. Two days broke the rule grossly—viz., May 16th and 24th, and I cannot offer a reason for it.

2. The external temperature increased from 42° to 72° in the same period. Thus the lines of pulsation and external temperature, in each of the two first weeks, begun low on the Monday, and increased together to the Saturday (falling from the Saturday to the Monday). In the third week both were low on the Monday, but fell lower on the Tuesday or Wednesday, and then rose together to the Saturday; thence they rose together through the Sunday to the Monday, and suddenly rose greatly on the Wednesday and Thursday, after which both fell to the end of the week.

3. The internal temperature rose from 60° to 73°, and the weekly averages were 62·4, 65·4, 63·6, and 66·5. The variations were to a less extent than those of the external air, but, with the exception of the third week, they support the rule now laid down. In the third week both temperatures were very low, and there was this correspondence with the

pulse, that the pulsation did not increase in that week in the proportion of the increase of the preceding and succeeding week.

4. The influence of temperature is not proportionate to the number of degrees. Thus, so long as it remained at or below 60° externally, and 64° internally, the influence of its variation was inconsiderable. (See the first week and the second week to the Thursday.) On the other hand, when it exceeds those degrees, the effect is great, and increases in a vastly increasing ratio with increase of degrees. There were two remarkable ascents both of temperature and pulsation—viz., on the Friday and Saturday in the second week, and the Wednesday and Thursday in the last week; and on those days I noted (see the explanation of the diagrams) that the effect on my own system was hot and oppressive. Thus, whilst the temperature feels agreeable, the pulse is but little influenced, but when and whilst it feels oppressive it is greatly increased.

A temporary fall of temperature lowers the pulse, but if it occur after a continued rise of temperature, the pulse does not fall so low as before the rise. Thus, in the third week, both the external and internal temperature fell as low as it was on May 14th; but although the pulse fell also, it never fell so low as on that day.

We now refer to the lower part of the table.

In the morning the pulsation was more under the control of the internal than of the external temperature, and upon the whole corresponded with it. The daily pulsations rose from 261 to 300, and the successive weekly averages were 269, 272, 282, and 290.

Three points are worthy of notice as especially confirming the rule:—1. The pulse increased from the second Saturday to the Monday, because the morning temperature was exceedingly high on those days, and it is probable that it was yet higher on the intervening Sunday; on the Monday morning it was insufferably hot and oppressive in the wards. 2. It fell from the third Saturday to the Monday, because the same temperature then fell also. (Both of these are opposed to the state of the pulse and temperature on the same days on the upper half of the diagram.) 3. The highest pulsation and temperature in the fourth week were on the Thursday.

In the evening the lines both of temperature and pulsation differ much from the morning. The pulsation increased from 280 to 327, and the weekly averages were 289, 291, 305, and 319, and thus supported the rule.

The facts peculiar to the evening are as follows:—1. The two exceptional days—viz., May 16th and 24th—before mentioned, are much more marked than in the morning. 2. The increase in pulsation in the fourth week began one day earlier, for the highest temperature in the wards was on the Wednesday evening and Thursday morning. 3. The third week was very exceptional, for not only was the pulsation then low with the low temperature, but the two lines in their course were directly opposed to each other, and chiefly so in the first three days. 4. The temperature, and pulsation too, increased from the third Saturday to the Monday; and upon the whole, the character given to the upper part of the diagram is chiefly due to the evening pulsations. 5. It is manifest that the evening internal temperature was more under the control of the external tem-

perature than the morning, but the morning pulsation more closely corresponded to the line of temperature.

Thus the total pulsations, and also those of the morning and evening separately, prove incontestably that pulsation is increased (within limits) by increasing temperature, and decreased (within limits) by decreasing temperature.

The cases differed much in themselves in respect of the closeness of the relationship now indicated. Nos. 73 and 79 were almost equivalent to thermometers, whilst No. 51 (who had Bright's disease also) presented a direct opposition to temperature during the first week of the inquiry, when the temperature was very low. With this one exception, all the cases supported the rule. No case presented the same close relationship in every week; but, in order to show the weekly relationship in all the cases, I have arranged the relationship under six heads—viz., "very great," "great," "moderate," "little," "rather opposed," and "opposed."

TABLE XXVI. *Showing the degree of relationship between temperature and pulsation in* 11 *cases in each of four weeks, at* 8 A.M. *and* 4 P.M.

	Eight A.M.				Four P.M.			
Week	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Very great	2 } 5	2 } 4	4 } 8	3 } 7	1 } 4	} 5	2 } 6	3 } 7
Great	3 }	2 }	1 }	4 }	3 }	5 }	4 }	4 }
Moderate	3	5	2	3	2	5	2	3
Little	2	1	..	1	4	1	...	...
Opposed (rather)	...	1	1	...	...	...	3	...
Opposed	1	...	...	...	1	...	..	1

Thus in but three instances were the lines opposed; whilst a "very great" and "great" relationship is found in more than half the cases in all the weeks. It is evident that the relationship is greater in the morning, and in the third and fourth weeks both morning and evening—that is, when the temperature was more elevated. This increased relationship in the evening is not due to evening increase of pulsation.

The cases may be arranged in the following order in reference to their agreement with this rule, beginning with that in which the relationship was the closest:—Nos. 73, 79, 107, 95, 88, 90, 69, 85, 77, 46, 58, 80, and 57.

Why certain persons do not bear heat well.—On two occasions I inquired into this subject. On May 30th the weather was very chilly, and I found that six patients felt better and six felt worse with the cold, but I omitted to note their numbers. On June 6th the weather was very hot, and six patients bore it badly, and five were but slightly influenced. The six who bore it badly were Nos. 79, 80, 90, 85, 107, and 88; and the five who bore it well were Nos. 73, 77, 69, 46, and 95. I subsequently ascertained that those who bore the heat badly had the pulsations greatly increased by it, but the others were but slightly affected. Thus is was evident that in the former the heat increased the wear and tear, and induced exhaustion.

The effect is shown in the following table, which includes the two oppressive periods—viz., May 25th and 26th, and June 5th, 6th, and 7th, both at eight A.M. and four P.M.:—

TABLE XXVII. *Showing the effect of high temperature on pulsation in each case.*

Case.	Eight A.M.						Four P.M.					
	May 25th & 26th.			June 5th, 6th, & 7th.			May 25th & 26th.			June 5th, 6th, & 7th.		
	Gen. expression.	Pulsation.		Gen. express.	Pulsation.		Gen. express.	Pulsation.		Gen. express.	Pulsation.	
		Incr.	Decr.		Incr.	Decr.		Incr.	Decr.		Incr.	Decr.
88	moderate	8	...	great	13	...	v. great	19	..	v. great	18	10
79	very little	3	...	ditto	14	...	mod	9	5	ditto	17	8
85	moderate	9	...	ditto	11	...	v. great	18	...	none	...	5
80	ditto	8	6	v. little	6	7	ditto	15	..	v. great	17	...
107	none	...	6	great	10	...	great	11	...	little	6	...
58	?	5	7	.	..	...	ditto	13	...	...	..	...
73	very great	15	..	none	4	4	none	2	2	great	11	...
75	very little	4	...	.	...	...	mod.	9	...	..	...	...
69	ditto	4	...	none. Had fev.	...	12	great	12	...	v. little	4	...
90	none	4	...	great	17	8	v. little	3	...	none	...	5
95	ditto	...	4	little	5	..	mod.	9	...	little	5	..
77	..	..	...	v. little	5	3	...	..	...	none	2	2
46	...	...	...	none	...	6	...	..	...	v. little	6	4

It is evident that the evening effect was greater as the evening temperature was greater. In dividing the cases into two categories the first six must be classed as those most influenced by temperature; and the following arrangement is probably very near to the truth:—1. Those who suffered from the great heat—Nos. 88, 79, 80, 107, 85, and 58. 2. Those who did not suffer from the great heat—Nos. 46, 77, 95, 90, 69, 75, 73.

Each case is arranged in the order of intensity, beginning with the most intense; and thus 88 suffered the most, and 46 the least.

If the two series now given be compared with the cases as influenced by heat, a perfect correspondence will be found, except case 90, who suffered from the heat, and yet the increase of pulsation was but little; and hence it may be inferred that the increase of pulsation would, on a large scale, be a measure of the suffering from great heat.

There are thus three expressions which indicate the variation in the effect of heat upon the system:—1. The extent to which the pulse is influenced by it; 2. The regularity with which the pulse varies with the varying degrees of heat; and 3. The degree of ease with which oppressive heat is borne by different patients. All these differ in individuals.

PART II. — THE RATE OF RESPIRATION IN PHTHISIS.

This was determined by the same inquiry as that of pulsation, and is represented upon the same diagrams.

Absolute Frequency.

The total results of upwards of 1500 observations show the average rate to be 23 per minute, with extremes of the averages of 16 and 31, as shown in the following table:—

TABLE XXVIII. *Showing the average rate of respiration in each case, arranged in the order of frequency.*

Case	73	77	93	58	107	90	46	95	51	79	80	85	88	75	69
Average rate	31·	28·7	27·3	25·6	24·9	24·7	22·7	22·6	22·4	20·6	20·6	20·6	18·1	17·	16·

Thus, in four cases the rate exceeded 25, and in three it was below 20 per minute. The extremes in single observations were much greater—viz., 11 in No. 75, and 43 in No. 73. So that in the average extremes the greater was double of the lesser, whilst in the absolute extremes it was four times the lesser.

The average weekly variations varied from 2 to 5 respirations; and in 9 out of 12 cases the rate diminished as the month advanced, as is seen in the following table:—

TABLE XXIX. *The weekly average rate of respiration in 12 cases.*

Case	88	107	75	77	79	69	58	46	95	90	85	73
1st week	21 2	25 4	19·6	..	22 7	18·9	27 3	...	23 3	21·1	20·4	31·5
2nd ,,	18 4	27 1	14·4	.	21·4	16·1	24	..	22·8	22·2	21·5	31·
3rd ,,	17·9	23·7	...	31·6	18·6	15·	...	24 3	22·	23·1	20·8	29·5
4th ,,	17·2	23 6	...	27·9	19·1	14·2	.	21·2	22·6	22·7	20·	32·2

In the first 9 cases there was a decrease, whilst in the last 3 the rate was stationary, or slightly increasing. Thus whilst the disease was generally progressing, the respiration declined; and in case 85, in which the progress was very great, the respiration was stationary.

There is a general relationship between frequency of respiration and extent of disease, as is shown by the following order of the cases, beginning with the most intense:—

TABLE XXX.

Order of extent of disease Nos.	90	88	73	77	85	107	95	46	80	69	79	58	75	51
,, frequency of respiration ,,	73	77	58	90	107	51	95	46	80	85	79	88	75	69

See Table No. XVI.

NOTE.—When any number of cases are bracketed together, on account of the identity of their returns, their order may be varied without altering their values; and this has been done in the foregoing and succeeding tables of comparison.

There is also a general relationship with frequency of pulsation in the cases, considered for the whole period, as is proved by the following comparison:—

TABLE XXXI.

Order of frequency of respir. Nos.	73	77	93	58	90	107	46	95	51	79	80	85	88	75	69
,, ,, pulsation ,,	85	77	73	93	90	46	80	79	107	88	58	95	69	75	51

No. 85 is the most singular exception, since, with a medium frequency of pulsation in one day of 152, and a total monthly increase of 30 pulsations, the respirations were only 20 per minute, and rather declined through the month.

The relation was very various in instances of temporary increase of pulsation. Both were increased together on the following occasions:—The evening increase; the increase from great temperature on June 6th; case 73, on various occasions; case 80, in the third week, in the evening; case 107, on May 24th (morning); and cases 58 and 46. Both fell together in case 51. There was direct opposition or indifference in cases 69, 95, 88, 75, 77. In case 85 there was no increase in respiration with increase in pulsation; and so, also, in case 88, on May 19th, although the medium increase was 26 pulsations.

There is an inverse relation between rapidity of respiration and height of body, as in the following table, in which the order of respiration begins with the most frequent, and of height of body with the least:

TABLE XXXII.

Order of height of body Nos.	73	51	107	80	77	58	75	95	88	85	46	79	90	69
,, ,, in feet	4·9¾	5·4	5·5⅛	5·5¼		5·5½		5·6⅛	5·6¾	5·7	5·7½	5·7¾	5·8¼	6·1¼
Order of freq. of respir. Nos.	73	77	58	107	90	51	46	95	80	85	79	88	75	69

Cases 85 and 95 here agree with this rule, and case 88 is less exceptional; but there are several exceptions. The tallest and the least agree with the rule.

There is some general relation between frequency of respiration and vital capacity. In the following table the vital capacity is represented both by the quantity existing and the amount lost from a state of health:

TABLE XXXIII.

Order of frequency of respiration	73	77	58	107	90	46	51	95	79	80	85	88	75	69
,, existing vital capacity, beginning from least	85	77	107	88	79	90	73	58	46	80	51	95	75	69
,, loss of vital capacity, beginning from greatest	not known		90	79	107	46	88	80	58	73	51	75	95	...

The agreement is thus somewhat greater with the existing vital capacity. Cases 77, 80, 75, and 69, agree perfectly, and 107, 90, and 46, nearly; but there are many exceptions. It must, however, be remembered, that the determination of the vital capacity is liable to much error.

There is also a similar general relationship between rapidity of respiration and excitability of temperament. Thus:

TABLE XXXIV.

Order of frequency of respiration	73	77	58	107	90	95	51	46	80	85	79	88	75	69
Activity of temperament from greatest	73	88	107	77	85	79	90	95	80	69	51	58	46	75

The estimation of the temperament is liable to fallacy; but as Nos. 73, 77, 107, 51, and 80, agree perfectly, and Nos. 90, 95, and 75, nearly, there must be the general correspondence now sought for.

Thus, a review of the foregoing comparison leads us to accord a certain amount of belief to the statement that there is a general correspondence between rate of respiration and the following subjects—viz., extent of disease, frequency of pulsation, short stature, lessened vital capacity, and excitable temperament; but in all these are exceptions, and in none is one the measure of the other.

DISTURBING CAUSES.

A. *Period of the Day.*

On the total average the evening respirations were one-eleventh more frequent than those of the morning—viz., 21·8 and 23·6. The extremes were very great—viz., 12 and 32·3 in the morning, and 11 and 40·6 in the evening. The evening excess varied in the different cases as follows:

TABLE XXXV.

Order of evening excess. Cases	73	93	80	46	77	58	85	Total average.	75	107	95	90	69	88	79	51
Amount of evening excess	5·9	3·6	2·9	2·3	2·2	2·1	2·0	1·8	1·4	1·1	·8	·6	·5	·4	·3	—·2

Thus, 1 only had no excess; in 1 it was nearly six respirations; in 6 it was under one respiration; and in half of the cases it was under two respirations. The total average was 1·8 per minute. The two or three cases at the head of the list must have some exceptional peculiarity. As two of these had the most frequent rate of respiration, and three at the foot of the list, Nos. 69, 88, and 79, had the least frequent, there may be some relation between rate of respiration and evening excess; but the middle cases vary greatly in reference to this rule. There is no clear correspondence between this evening excess and excitability of temperament, lessened vital capacity, frequency of pulsation, extent of disease, or height of body; but in the two latter there are some approaches to it.

There is a relationship between evening excess of respiration and pulsation. Thus—

TABLE XXXVI.

Order of excess of respiration.—Cases	73	93	80	77	46	58	85	75	107	88	79	90	95	69
„ „ pulsation	73	46	88	77	80	58	93	85	107	51	79	90	75	69

No. 88 is very exceptional, since, with an average evening increase of 12 pulsations, the increase of respiration was only ·4.

The weekly variations in the evening excess of respiration are shown in the next table.

TABLE XXXVII.

Case	73	80	46	77	58	85	75	107	95	90	69	88	79
Average, 1st week	5·4		..	...	1·0	2·4	2·1	·2	1·	=	·3	—·8	·1
„ 2nd „	6·1	3·4	.	..	2·3	2·2	·8	2·4	1·	1·2	·4	·3	—·8
„ 3rd „	6·3	3·2	2·7	4·7	...	1·5	...	1·8	1·	1·6	·9	—·2	1·5
„ 4th „	6·1	2·2	1·8	3·7	...	2·3	...	2·	·5	—·6	·6	2·	·6

Thus, 3 of 13 cases had no excess in one or more weeks. No. 88 is remarkable as having an excess of 2 respirations in the last week, whilst

there was none in the first and third, and but a very slight excess in the second week. This was not due to increased rate of respiration, for the rate fell 4 respirations between the last and the first week.

There is no uniform correspondence between weekly increase or decrease, whether of pulsation or respiratien, and increase or decrease of evening excess.

The uniformity of evening excess is much lessened by referring to the daily experience of each case. Thus, of 814 observations, only 458 (or little more than a majority) had the excess.

B. *Posture of Body.*

The effect of posture is to increase the rate of respiration in the sitting and standing postures, but not with uniformity. Thus, of 502 observations, 300 (or three-fifths of the whole) showed an excess in sitting over lying, and 237 (less than a majority) an excess in standing over sitting. The average returns were as follows:

Lying 22· ...... Sitting 23· ...... Standing 23·4

Therefore, in neither the sitting nor the standing posture is the excess to one-half of the proportionate extent noted under pulsation.

The amount differed much in the several cases. Thus—

TABLE XXXVIII.

Order of sitting over lying. Case	77	51	58	73	79	85	75	88	90	46	93	80	107	69	95
Amount of sitting over lying	3·5	2·8	2·4	1·7	1·5	1·3	1·2	1·2	1·1	·9	·6	·5	·3	·1	—1·7
" standing over sitting	2·6	—1·3	1·5	·1	·1	·5	·3	—·9	·1	—·2	1·9	—	=	=	—·5

Thus, in 1 case there was no increase, but a large decrease from posture, and that was the healthy-looking ruddy farmer with one lung nearly sound. In 1 only was the increase in the standing over the sitting greater than that of the sitting over the lying postures. In 3 the increase was equal, whilst in 4 cases there was no increase in the standing over the lying posture. 1 case showed the greatest decrease from the standing posture, and at the same time nearly the largest increase from the sitting posture; whilst another case exhibited the greatest increase in both the sitting and the standing postures. In 9 of 15 cases the average increase in the sitting posture was over 1 respiration.

The influence of period of the day in modifying the influence of posture of the body is to increase it. Of 238 observations in each position, there was an increase at four P.M. of 179 in the lying, 154 in the sitting, and 125 in the standing, or in more than a majority of the observations in each of the positions. The excess was the most constant in the lying posture; and in the standing posture the constancy was much greater than the amount of excess. In this respect it accords with the returns from pulsation, and also in the following one—viz., that whilst the rate is greater in the evening, the excess of one position over the other is less than in the morning. Thus, on the total average excess of sitting over lying, 1·8 morning, ·9 evening; of standing over sitting, ·5 morning, ·4 evening, and the total of standing over lying, 2·3 morning, and 1·1 evening. Four cases were exceptional—viz., 77, 6· morning, 7· evening; 58, 2·9 morning, 4·8 evening; 85, 1·9 morning, 2·6 evening; and 69, ·4 morn-

ing, and ·5 evening. But in no instance was there such an exception in reference to pulsation. In two of the above exceptions—viz., 77 and 58, the increase from position on each of the postures was very great.

TABLE XXXIX.

	Sitting over lying. Morning.	Sitting over lying. Evening.	Standing over sitting. Morning.	Standing over sitting. Evening.	Standing over lying. Morning.	Standing over lying. Evening.
No. 77	3·2	3·6	2·7	3·3	6·	7·
No. 58	2·2	2·5	·7	2·3	2·9	4·8

On the contrary, 7 cases (Nos. 95, 88, 80, 46, 107, 69, and 51) had no total average increase in the standing over the lying posture; whilst in others that increase was so great as 19 respirations. The total extremes in the increase were—sitting over lying, 11 morning, 17 evening; standing over sitting, 8 morning, 12 evening; and standing over lying, 11 morning, and 19 evening. Thus the extremes were the greatest in the evening.

C. *Influence of Temperature and Dryness of the Air.*

This is very remarkable, and tends to lessen the rate of respiration. The relations are shown in diagram No. 5, constructed, as already stated, under the head of pulsation; but in each department there are two lines representing respiration—viz., No. 1 for comparison with temperature and humidity, and embracing only the returns of those cases which were under observation for the whole month; and No. 2 for comparison with pulsation, since both of these lines embrace all the cases, whether observed for a month or a shorter period.

The line of respiration, on the one hand, and those of pulsation, temperature, and dryness, are directly opposed, both in the whole month and in each week, except the third week. Thus, 1st. The respirations declined from the beginning to the end of the month; 2nd. They declined from the Monday to the Saturday in the first, second, and fourth weeks. The line of dryness usually followed that of temperature (except during rain); and both attended upon the line of pulsation; and all had a course opposed to that now stated in reference to respiration. As, therefore, the temperature, dryness, and pulsation increased, so the respirations decreased. The third week was exceptional, and in that the respiration rather followed the line of humidity than that of low temperature; and in that week only was there rain. This exceptional character was, however, much less marked in the evening than in the morning returns; and it is very evident that in both the morning and evening investigations the pulsations were kept low and the respirations high by the great cold and humidity of that week, as compared with their course in the coterminous weeks.

The above statement has reference to the fact that commonly the line of dryness of the air corresponds with that of temperature; and hence it is difficult to consider one apart from the other. Whether, therefore, the influence over respiration is exercised by humidity or temperature, or both combined, it is scarcely possible to determine; but the returns of the third week seem to imply that there is an inverse relation between humidity and respiration, whatever may be the relation with heat.

RATIO OF THE RESPIRATION TO THE PULSE.

The ratio of the total averages is 1 : 4·1, and it varied in the different cases from 1 : 6·2 to 1 : 3·3, or a doubling of the lesser ratio. Thus—

TABLE XL.

Order of ratio. Case ...	85	88	69	75	80	79	46	Total ratio.	90	95	77	107	93	58	51	73
Amount of ratio, as 1 to	6·2	5·4	5·2	4·9	4·6	4·4	4·2	4·1	3·9	3·8	3·8	3·7	3·6	3·5	3·4	3·3

In four-fifths of all the cases the ratio was less than 1 : 3, and more than 1 : 5.

In 85 the lessened ratio is due to enormous rapidity of pulsation; whilst in 88 and 69 it is rather due to slowness of respiration; and No. 73 had the highest ratio from the rapidity of his respirations.

The ratio lessened as the month advanced and the disease progressed, as was shown by the increasing rate of the pulse and decreasing rate of the respiration. The extent of this decrease is seen in the following table, which gives the weekly averages, the cases being arranged as in Table No. XXIX.

TABLE XLI.

Case	88	107	75	77	79	69	58	46	95	90	85	73
Ratio, 1st week, 1 to	4 3	3·7	4 2	..	4·1	4 3	3·3	...	3·6	4·6	5·8	3·3
„ 2nd „ „	4 9	3·5	5 8	..	4·3	5·0	3·6	...	3 7	4·5	5·8	3 37
„ 3rd „ „	5·1	3 8	...	3 5	4·2	5·7	...	4·	3 5	1·2	6 2	3·5
„ 4th „ „	5·4	3 8	...	4 1	5	6 2	...	4·5	3·9	4·5	7·	3 25

Thus, in 10 of 12 cases the ratio decreased, and particularly in Nos. 69, 85, 75, 88, 79, 77, and 46, in the order in which they are placed; and in some degree this order was that of diminution of respiration and increase of pulsation. It also includes all the cases of evident progress except 107, and also two in which I could not detect progress; and I am disposed to regard the varying ratio as evidence of the general (not momentary) progress of disease. This fact may be tested by the returns from No. 69, since the period of sudden accession and the decline of that increase may be determined with accuracy—viz., from May 31 to June 7. The following are the varying ratios at 8 A.M. and 4 P.M.

TABLE XLII.

Date	May 30	31	June 1	2	3	4	5	6	7
Ratio at 8 A.M., as 1 to	... 5·2 ...	5·6	... 6 1 ...	6 4	... omitted ...	5·8 ...	6·5 ...	6·0 ...	5·7
„ 4 P.M. „	.. 6·0 ...	omitted	... 6·4 ...	omitted ...	ditto ...	6·4 ...	6·3 ..	6·2 ...	6·3

It thus appears that the ratio declined until the acme of the attack, and thenceforward increased. There is no correspondence between the ratio and height, age, temperament, and vital capacity, and but little with frequency of pulsation, in the cases; but the ratio is the greatest in the cases of most frequent respiration.

On the total average the ratios at 8 A.M. and 4 P.M. were identical (4·17), but in 8 of 15 cases the ratio was a little less in the evening, as is seen in the following table :—

TABLE XLIII.

Case … … … …	88	61	46	79	77	107	58	90	85	93	73	95	75	80	69
Ratio at 8 A.M., as 1 to	4·6	3·1	4·1	4·4	3·8	3·6	3·4	4·5	6·3	3·7	3·4	3·0	4·95	4·6	5·2
„ 4 P.M. „	5·1	3·5	4·3	4·6	3·9	3·7	3·6	4·6	6·	3·5	3·2	3·7	4·8	4·5	5·2
	Evening decrease.								Evening increase.						Equal.

There is no relation between this evening change in ratio and evening excess either of pulsation or respiration; but there is a slight tendency to a relation between excess of evening ratio and evening excess of respiration.

Posture of body influences this relation, and the ratio is the greatest in the lying posture. Thus, lying, 1 : 4; sitting, 1 : 4·15; and standing, 1 : 4·63. The considerable diminution in the standing posture is rather due to the lessened rate of respiration in that posture than to increase of pulsation. Thus, the erect posture and muscular exertion increase the pulsation disproportionately to the respiration, and lessen the ratio. This rule is supported by the returns from each case. Thus—

TABLE XLIV.

Case	95	88	75	80	79	69	107	46	85	51	93	58	73	90	77
Ratio lying, as 1 to	3·	4·3	4·5	4·2	4·3	5	3·4	4·	5·9	3·3	3·3	3·5	3·3	4·4	3·8
„ sitting „	3·8	4·8	4·8	4·6	4·4	5·	3·7	4·2	6·	3·27	3·6	3·5	3·3	4·4	3·8
„ standing „	4·3	5·5	5·3	5·	4·07	5·6	4·	4·6	6·4	3·4	3·7	3·7	3·4	4·5	3·6

In every case but one the ratio was greater in the lying than in the standing posture; and there was a decrease from the sitting to the standing posture. In 6 cases the ratio was the same in the lying and in the sitting postures; and thus practically the sitting and the lying postures have the same ratio, and are both equally opposed to the standing posture. The diminution in the standing posture is exceedingly well marked in Nos. 95 and 88, and they had great difference of pulsations from posture; whilst No. 95 had scarcely any increase of respiration, and No. 88 had a decrease in the evening. In the last 5 or 6 cases neither pulsation nor respiration were much influenced by posture. Period of the day had but little influence over the ratio in the three positions. Thus—

TABLE XLV.

	Lying.		Sitting.		Standing.
Ratio at 8 A.M., as 1 to	3·94	…	4·1	…	4·5
„ 4 P.M. „	3·97	…	4·2	…	4·4

The following is a summary of the preceding communication.

1. The average rate of pulsation was 95·3, and of respiration 23· per minute. The extremes were 55 and 166 pulsations, and 11 and 43 respirations.

2. The rate of pulsation was not dependent upon the stage or progress of the disease, or the degree in which the system had become implicated.

3. The more extensively diseased or advanced cases of disease differed

from the others in that fewer of them had a non-excitable temperament, they had a less vital capacity, and a more frequent average rate of pulsation and respiration, with wider extremes.

4. The weekly average variations in respiration were from 2 to 5 respirations, and at that period of the year the rate of respiration declined, whilst that of pulsation increased.

There is a general relationship between frequency of respiration and extent of disease, frequency of pulsation, short stature, lessened vital capacity, and excitable temperament; but there are many exceptions.

5. The average rate of both pulsation and respiration is greater at 4 P.M. than at 8 A.M., to the extent of 7·2 pulsations and 1·8 respirations, and the extremes are greater. The evening excess of pulsation was usually associated with extent of lung disease, frequency of pulsation and temperature, but not with activity of body. Probably there is some relation between the evening excess of respiration and frequency of respiration; but there is no indisputable relation between it and excitability of temperament, lessened vital capacity, frequency of pulsation, extent of disease, or height of body. The evening excess of respiration varied much from week to week, and more particularly from day to day, in which latter a bare majority only had the evening excess.

Posture of body affects the rate of both functions so as to increase it in the sitting, and still more in the standing posture. The total average increase in pulsation was 8¼ in the sitting, and a further 8½ in the standing posture. In the morning the difference was 10 pulsations in each position, whilst in the evening it was 7 in each position. The rate of pulsation in each posture was thus greater in the evening, but the difference from posture was less, and chiefly in the standing posture. The extremes in each posture were less widely apart. The variation in the increase from posture was not dependent upon age, temperament, amount of lung disease, frequency of pulsation, or stature.

The exceptions to the increase were most numerous in the sitting and standing postures, and more particularly in the evening.

The rate in the sitting posture is the mean pulsation in all postures.

The average increase of respiration in the sitting posture was 1, and in the standing ·4; and only three-fifths of the observations showed the excess in the sitting, and less than half in the standing postures. Thus, the effect of posture is less, and is less constant in respiration than in pulsation. It was increased in the evening, but most in the lying posture; and the increase was the most constant in the lying posture, whilst in the standing posture the constancy was greater than the amount of the excess. The cases differed much in the amount of the excess, and in some it amounted to even 19 respirations.

6. The influence of increasing temperature was to increase the dryness of the air and the rate of pulsation, and to lessen the rate of respiration. Whilst the temperature was externally under 60°, and internally under 64°, the rate of pulsation was not greatly influenced; but when above this the influence was great, disproportionately to the number of degrees. Those persons who do not bear heat well have great increase of pulsation from heat, and those who bear it well have not a similar increase. Falling temperature lowers pulsation and increases respiration; but if it

succeed to an elevated condition, the functions do not soon attain to the same state as with the same temperature previous to the elevation.

The rate of respiration is manifestly influenced by the dryness of the air, and is inversely as the dryness.

7. The ratio of the respiration to the pulse was 1 : 4·1; but in four-fifths of the cases it was on the average less than 1 : 3 and more than 1 : 5. It lessened as the temperature or the disease progressed, and was due to the rate of respiration rather than to that of pulsation. Probably the diminution of the ratio may be a test of the progress of the disease. It was scarcely different at 8 A.M. and 4 P.M., but was lessened in the sitting, and still more in the standing, postures. Thus the erect posture, muscular exertion, and wear and tear, lessen the ratio of the two functions.

Deductions, or Inferences.

1. There is no rate of pulsation or respiration indicative of phthisis, or of any stage of phthisis; but whilst the rate of both is on the average above that of health, it may be, in any stage, much lower than that of health.

2. In cases of phthisis, whether greatly advanced or not, there is as much food taken, on the average, as would have been in health, with the same degree of exertion; and hence it may be inferred that the appetite and digestion are also good;—yet the weight of the body diminishes. Hence the food must be consumed more rapidly than in health, or be less perfectly assimilated and deposited, or the material having been only deposited it is more quickly removed.

3. In the more advanced cases less air is admitted into the lungs, and the rapidity of both respiration and pulsation is greater, and there are wider extremes in the rate. Thus, the changes of aëration and assimilation must be less perfectly performed, whilst all the functions in the body are more frequently and rapidly performed, and the wear and tear probably greater.

4. It is probable that one sound and one extensively diseased lung is less injurious than both lungs diseased to a much less extent; and that moderate consolidation and destruction together is worse than more extensive consolidation alone, and the more so still if both lungs are moderately affected.

5. At four P.M. all the functions are more frequently performed than at eight A.M., and consequently more exhaustion will follow. This increase is chiefly due to food, temperature, sun-light, and exertion; and it is more so when the lung disease is considerable. The proportionate diminution in the respiratory function is greater in the evening.

6. The effect of posture is much greater than in health (Dr. Guy's observations in reference to the latter being accepted); but chiefly in the morning, and in the influence of the sitting over the lying posture. In health, the excess in the sitting posture was about $3\frac{1}{2}$, and in the standing over the sitting nearly 9; whilst in phthisis it was 7 in each in the evening, and 10 in each in the morning. Hence the sitting and standing postures in phthisis call for more expenditure of power, and tend to produce more subsequent exhaustion, than in health; and the lying posture would save the strength. The effect upon respiration is much less, and

especially in the standing posture. Hence the latter posture further tends to exhaust the system by increasing the blood-motion, and not also the entrance of air into the system.

7. High temperature, with the accompaniment of dry air, also tends to rapid exhaustion by greatly increasing the blood-motion and greatly lessening the introduction of air; and, on the contrary, low temperature and moisture increase the aërification of the blood and lessen the rapidity of the blood-current. Hence, in phthisis, a moderately cool and moist air is the most conducive to health, and the hot summer season must induce exhaustion.

8. No one should be sent to a hotter climate who bears heat badly; but if he bear it well, and need a milder air, he will not be more exhausted, and particularly if the air be rather moist.

DESCRIPTION OF THE DIAGRAMS.

Diagram No. 1, exhibits the average rate of pulsation and respiration in each of the postures of lying, sitting, and standing, on a total of 3100 observations, on all the cases combined, and on every day at eight o'clock A.M., and four P.M., for the whole month. The temperature of the ward at eight o'clock A.M., and four P.M., and the mean external temperature of the day for the same period, is placed at the head of the Diagram.

Diagrams Nos. 2, 3, and 4, are similarly constructed, but they exhibit the like facts in each case separately. In No. 2 are the cases Nos. 69, 90, 79, and 85. In No. 3, the cases Nos. 88, 58 and 46, 75 and 77. In No. 4, cases 95, 107, 73, 51, and 80.

In each of the above Diagrams, the date of each day is placed at the head and foot of the Diagram, and the value of any of the lines on each day is ascertained by referring to the scale of Nos. on either side. All the lines on the left of the central line refer to the examination at 8 A.M., and on the right to 4 P.M. The same kind of line which indicates one posture in the lines of pulsation is used for the like posture in the lines of respiration; and the same plan is carried out through all the Diagrams.

When two cases consecutively occupy the whole month, they are placed consecutively upon the same Diagram, so as at first sight to appear like one case only, but the point of termination of one case and the commencement of the other is clearly indicated. This may be seen on Diagrams 3 and 4.

In reference to the parts of the Diagrams indicating the temperature, it was intended to place in each day the expression of the effect upon my own feelings, but the necessary smallness of the squares prevented the adoption of this course. The effect is therefore given in this place; and the reader may readily refer the description to the diagrams:

May 14. Dry, dull.
15. Dry, dull.
16. Dry, comfortable.
17. Dry, warm, comfortable.
18. Ditto.
19. Ditto.
21. Dry, dull.
22. Little rain, dull.
23. Dry, dull, warm.
24. Ditto.
25. Dry, oppressive.
May 26. Dry, oppressive.
28. Rain in the night, comfortable.
29. Rain, cold, dull.
30. Ditto.
31. Much rain, cold, dull.
June 1. Rain, comfortable.
2. Warm, comfortable.
4. Dry.
5. Dull, hot.
6. Very hot, oppressive.
7. Rain in the night, very hot.

Diagram No. 5 shows at the lower part the total average pulsations and respirations in the three postures, combined with the temperature of the wards on each day at 8 A.M. and 4 P.M. In the upper part, the total average at 8 A.M. and 4 P.M., combined in the three postures, is represented as obtained by adding together the returns on the lower part of the Diagram: it therefore represents the average daily rate; but each return must be divided by 6 (the three postures taken twice over), in order to gain the true mean daily rate. There are also added, the mean internal and external temperature; and the degree of dryness of the air is indicated by the dew-point.

There are two lines indicative of respiration: that marked No. 1 is intended for comparison with temperature and humidity, and No. 2 with pulsation.

PART FOURTH.

Chronicle of Medical Science.

HALF-YEARLY REPORT ON FORENSIC MEDICINE & TOXICOLOGY.

By BENJAMIN W. RICHARDSON, M.D.
Physician to the Royal Infirmary for Diseases of the Chest, and Lecturer on Forensic Medicine at the Grosvenor-place Medical School.

1. TOXICOLOGY.

THE past six months have been rendered notorious by the additions that have been made to practical toxicology. Arsenic, antimony, strychnia, have all been invested with new terrors, owing to their application to criminal purposes. We shall select out of the long calendar of poison cases before us, such as are most peculiar in their physiological and pathological characters.

Slow Poisoning by Arsenic: the Wooler Case.—The most complete history as yet given of the Wooler case is from the pen of Dr. Christison. In the beginning of May, 1855, Mrs. Wooler, a rather delicate woman, was attacked with pain and vomiting soon after an ordinary dinner. On the 8th of May she was seen by Dr. Jackson, who found her suffering from "gastro-intestinal irritation," and treated her with bismuth. She had a sickly look; a small frequent pulse; flatulence; frequent slight tickling cough, or rather hawking without expectoration; an occasional discharge of mucus from the bowels, with tenesmus and griping; redness of the eyelids and lining membrane of the nostrils; loss of appetite; and great failure of strength. In three or four days more there were anxiety, restlessness at night, and greater weakness; increased griping, tenesmus, and mucous discharge, now also streaked with blood; dryness or tightness in the throat, with hoarseness of the voice; and renewal of the vomiting.

The symptoms continued, in spite of treatment, till the 28th of May, when the mouth was found to be sore, and the throat so uneasy as to impede swallowing. Two days later, the stools, previously bilious, assumed a fatty appearance, owing to the presence of pus, as proved by the microscope. The vomiting and purging were now worse than ever, and the vomiting seldom occurred except after taking food or medicine. The tongue was red and fiery; the mouth and lips excoriated; the anxiety and restlessness very great.

On the 4th of June there were the same symptoms, and a further aggravation of them; but the stethoscope this day also betrayed slight tubercular infiltration at the summit of both lungs, most advanced in the right side—indolent, however, in both. Naturally, tuberculosis, affecting the abdomen as well as the chest, was for a time suspected; and cod-liver oil, with opiate injections, constituted the treatment. Mr. Henzell, however, on this day, began to conjecture that the symptoms he saw were those of slow arsenical poisoning.

On the 8th of June the nostrils were very red, the mouth and lips were much excoriated, and a source of great distress. The tongue was also red and sore. There was uneasiness in the gullet, [illegible] throat, a tickling irritation at the top of the windpipe, and hoarseness. The anus was excoriated. The patient

complained of pain in the stomach, urgent thirst, want of appetite, and frequent vomiting; of tenesmus, griping, and diarrhœa; of hiccup; of intense anxiety, restlessness, and general distress. The pulse was usually above 130, and feeble. The stools had been ascertained by the microscope to contain pus globules and blood discs for three days before.

On the 10th of June the urine, which was scanty, high coloured, and high in density, was ascertained to be albuminous, and to deposit blood discs and casts of uriniferous tubes.

On the 13th of June the face and arms presented an eruption, which gradually put on the character of eczema. The symptoms otherwise continued much the same, and still, as from the first, presented a paroxysmal tendency in point of severity.

On the 14th of June, Mr. Henzell obtained a metallic deposit from the urine by Reinsch's process, which he, however, could not at the time satisfactorily make out to be arsenic. The ammonio-citrate of iron was given as an antidote, and seemed for a time to mitigate the symptoms. The pulse fell from 160 to 120, but the countenance appeared more sunk, and the restlessness was excessive in spite of frequent doses of opium.

On the 23rd, the restlessness and weakness were extreme; the pulse feeble and intermitting; the edge of the tongue ulcerated, and the palate covered with papulæ, or pustules; the hands cold and moist; the vomiting severe; the diarrhœa less so. On this day the patient first mentioned to her attendants a sense of stiffness, numbness, and tingling, which she had felt in the arms for two or three days before. Prior to the 23rd, the urine had presented very much the character formerly described; but on this day what was presented for examination abounded in oxalate of lime crystals, and showed neither albumen, blood, nor tube casts. This was obviously a different urine, substituted accidentally or intentionally. Next day it presented its usual character, except that the albumen had disappeared. In that of the 22nd, Dr. Christison (who had meantime been consulted by the medical attendants) found arsenic unequivocally by Berzelius' modification of Marsh's process.

On the 26th, all the symptoms got worse, especially the vomiting and the tingling and numbness of the hands. The pulse was 144 or 150, very small, and weak. She was evidently sinking. In the subsequent night she was seized with paroxysms of tetanic spasm, gradually increasing in severity and duration, and at length becoming almost incessant. At half-past ten on the morning of the 27th she died, retaining all her mental faculties to the last.

Such were the symptoms; treatment of necessity had little effect. The post-mortem appearances are not less striking.

There was slight tubercular infiltration in the apex of each lung, and, in the left, a small cavity. The trachea and large bronchial tubes were much injected and red. The heart was small, pale, otherwise healthy. The liver was slightly enlarged, saffron coloured, friable, fatty. The interior of the stomach was slightly vascular in its greater curvature; but the smaller curvature presented groups of small vessels gorged with blood, so numerous at its larger end as to render the redness almost universal, and like a sheet of blood under the mucous coat, which was soft and friable. The duodenum was vascular internally, and full of black matter. The jejunum was much in the same state. The ileum was redder still, and throughout the lower third denuded of its mucous coat in many patches, varying in size from a shilling to a crown, and here and there involving its whole circumference. At the latter points the peritoneal coat was bare, thin, and very easily torn. Many mesenteric glands were prominent and black. The colon was everywhere vascular; numerous small ulcers pierced the mucous coat in the ascending and transverse portions; and the rectum was similarly but less extensively affected. The pancreas was vascular, the kidneys and spleen congested, the uterus healthy.

Arsenic was found in the liver, the heart, the lungs, the intestines, the rectum,

in a dirty blood-liquid from the peritoneal sac, and in a mass of viscera, consisting of portions of the stomach, the liver, spleen, and kidneys.

The question of the mode of administration of the poison still remains a mystery; but a medico-legal point has been mooted, in regard to the proceedings of the medical men concerned in this case, which is of great interest. It seems that Dr. Haslewood, Dr. Jackson, and Mr. Henzell, the said medical men, suspected poisoning on the 8th of June; but they did not disclose their suspicions openly up to the day of the lady's death, on the 27th. This proceeding called for a severe censure from the judge, who was of opinion that their suspicions ought to have been communicated either to the husband, or in the event of the husband being the suspected party, to a magistrate. Dr. Christison takes a different view, and thinks that in such cases the patient ought to be made the recipient of the suspicion.—*Edinburgh Medical Journal*, January and February, 1856.

Poisoning with Arsenic, with remarkable delay in the appearance of the symptoms.—A strong, healthy woman, about twenty-two years of age, of a rather excitable temperament, had been subjected to great mental agitation, through the threatened withdrawal of an acknowledged admirer, and had suffered from hysterics. She stated herself that she had eaten and drunken but little throughout the week; and on Thursday, the 29th of March, 1855, she took no food or drink, except one cup of coffee at breakfast. She spent the day in walking about without food. At nine o'clock in the evening of the same day she retired to her own room, and was heard, by the two occupants of the adjoining chamber, to be gagging and choking so violently and in such a manner, that one of them knocked at her door and inquired if there was anything the matter with her. She returned an evasive answer, and remained apparently quiet throughout the night. She kept in bed the next morning, and refused her breakfast, but attracted no special attention until nine o'clock, when the same sound of gagging and choking was heard in her room a second time. In the course of the succeeding two hours, an hysterical paroxysm came on. It was then ascertained that she had taken poison, and Dr. Hershey was sent for.

He arrived at eleven A.M., fourteen hours after the first dose had been taken, and two hours after the second. Nothing definite could be learned from her admissions or complaints. She lay in a state of partial cataleptic stupor, occasionally varied with slight muscular spasms. The usual effects of irritant poison were so entirely absent, that Dr. Hershey was induced to order an antispasmodic draught. Of this draught she took some four tablespoonfuls, the first fluid which she had taken for at least thirty-six hours. No change occurred until one P.M., when violent pain and vomiting suddenly came on. The most frequent, and in this instance, at that time, the only positive symptoms of arsenical poisoning had at last presented themselves, sixteen hours after the first powder had been swallowed, and four hours after the second.

As arsenical poisoning was proved, the hydrated oxide of iron was given, and continued in divided doses, to the amount of five ounces; but notwithstanding this, and the free use of the sulphate of morphia and cold mucilaginous drinks internally, and with depletion with cups, and the subsequent application of cataplasms and a blister externally, the pain and vomiting increased in severity until the afternoon of Sunday, the third day. She then appeared to be so utterly prostrated that no hopes were entertained of her recovery, either by herself or her physicians. A paper containing white arsenic was found, and an apothecary was visited, who stated that she had bought the poison of him on the Thursday.

The history given by the patient was, that, with the intent of ending her life, she secretly provided herself with arsenic, retired to her room, after a whole day of fasting and agitation, and attempted to swallow a teaspoonful of the dry arsenic powder, and was so irritated in the throat by it as to alarm her neighbours. She coughed out a part of it, but managed to retain about a teaspoonful. She lay down, as she expected, to die, but spent the night without change or sleep. The

next morning she swallowed another half-teaspoonful in the same manner as before, and with the same difficulty. She felt no pain until she began to take freely of drinks.

On the Sunday evening, the vomiting and pain ceased, and reaction commenced, accompanied with extreme feebleness, cool moist skin, temporary cataleptic spasms, inflammatory tenderness of the pharynx and whole intestinal region, going off with tormina, tenesmus, bloody stools, and strangury, followed in a few days by an acne-like eruption on the skin. The patient was restored to complete health in three months, no impairment of digestion remaining behind.

Cases of this kind, where the symptoms of the poison are so long delayed, are of great interest in criminal inquiries. The evidence in the above case is faulty in an important particular. It affords no chemical proof that arsenic was swallowed. The evidence from symptoms is however strongly in favour of the truth of the statements of the patient.—Dr. Hartshorne, *in the Philadelphia Medical Examiner*, December, 1855.

Poisoning by Oxalic Acid, taken in the solid state.—A case, in which oxalic acid was swallowed intentionally in the solid state, is published by Dr. Barker. Death in this instance was the result. "It appeared in evidence, that the deceased was only sixteen years old, and lived with his brother at Luton, who had charged him on the 4th instant with abstracting money without his knowledge and consent. This charge the accused at first denied, but afterwards acknowledged to be correct. He was of a passionate and revengeful disposition.

"After this, the lad proceeded at first to Dunstable, and afterwards to the town of Markyate Street, where he purchased one pennyworth of oxalic acid, between seven and eight o'clock in the evening. Between eight and nine o'clock the same evening he was found lying in a lane, moaning, and with some coloured fluid (as if from vomiting) close by him.

"Mr. W. A. Hubert, surgeon, of Markyate Street, was passing by the lane at the time he was found, and was called to him. While he was with him, he vomited fluid similar to that which was upon the ground. He was insensible, pulseless, and his lower jaw was spasmodically closed. Cold water dashed upon the face restored sensibility, and relaxed the jaw. The boy said that he had taken oxalic acid; *that he had eaten it, and did not make any solution:* and that his intention was to kill himself, because he had been charged with taking money.

"The deceased was carefully conveyed in a cart to his residence in Luton, when Mr. Frederick Clarke, surgeon, of that place, was sent for. He saw him between ten and eleven o'clock the same evening; found him but partially sensible, very drowsy, and in a state of collapse. He had vomited bloody matters, as well as some white fluid, which did not contain any crystals. His tongue and lips were unusually pale, but there was no excoriation. He could be sufficiently aroused to state that he had purchased half an ounce of the acid; that he had taken about a quarter of that quantity in the solid state; and that he was sorry that he had taken it.

"He died about half-past three A.M. on the 5th. The following were the post-mortem appearances, as detailed by Mr. Clarke at the inquest. The tongue was dotted over with white specks; the œsophagus was not inflamed. The stomach was extensively disorganized, and had the appearance of gangrene in some parts. The mucous membrane was detached in some parts, and, in consequence, the muscular coat exposed to view. The verdict was *felo de se.*"—*Association Medical Journal,* November 30th, 1855.

Poisoning by Strychnine: Battle's Vermin Killer.—Mr. Nunneley, of Leeds, has recorded a case of great moment as illustrating some peculiar points in cases of poisoning by strychnine.

The person, a woman, aged twenty, in whom the case occurred, was a stranger, at Leeds, and died under suspicious circumstances during the night. A short

time before her death she said she had taken poison, but gave no clue as to its nature or how she had taken it. After her death, "on examining her dress pockets, two empty small paper packets were found, the outer and inner bags of one packet of 'Battle's Vermin Killer,' according to the printed label upon them; they were folded up, the inner within the outer. There was also found a box of pills and a bottle of medicine, out of which one dose had been taken. These, it was ascertained, had been obtained for her a day or two before from some one at Huddersfield for a venereal complaint, and were of a simple character." The girl was refused a bed by the landlady of the Bean Jug public-house in Leeds, when a poor man, who lived near, out of sheer pity took her to his own cottage. She sat up till half-past twelve, and then retired to her chamber, which was small. "She did not eat or drink before going to bed, when she appeared to fall asleep, at least Mrs. Sheard (the man's wife), who said she lay awake for an hour, thought so, and was quite certain the girl did not get out of bed or move much about, and that there was no water or other fluid in the room, nor any vessel to drink out of. The man retired to bed after the woman thought her asleep. At a quarter to two o'clock Mrs. Sheard was awoke by the moaning of the girl, who was then, or immediately after, severely convulsed; the convulsions continued at frequent intervals for an hour. For another hour she was comparatively free from convulsion, and talked calmly and distinctly about her parents, and the conduct of her lover, and her having done something wrong, but refused to say what. During this time she drank freely of cold water, which was fetched from the room below, when a violent convulsion came on, in which she died. From the evidence of Mrs. Sheard it was very difficult to determine the exact form of the convulsions, as she did not at the time appear to consider the throwing about of the arms as convulsions; but from what Mr. Nunneley could make out, he had no doubt the lower extremities were principally rigidly extended, while the upper were strongly convulsed. It was owing to a more violent convulsion not very long before the girl's death, that Mrs. Sheard became seriously alarmed, and sent her husband to seek a medical man; during his absence death occurred, the girl continuing sensible until the last minute or two." Mr. Nunneley supposes that the poison taken was "Battle's Vermin Killer," which is sold in small packets, each packet consisting of an inner and outer paper envelope; it is of a blue colour, and appears to be composed of strychnine mixed with some farina, and coloured with Prussian blue; the quantity of strychnine being, so far as Mr. Nunneley could ascertain, about three grains to the whole packet. He is inclined to think that she had put the poison upon a small portion of bread and butter, and eaten it so soon as she found all quiet in the room, under the impression that she should die suddenly from it.

Mr. Nunneley "saw the body about twelve hours after death. The muscles were then flaccid, so that the want of rigidity mentioned was not owing to any post-mortem change; besides, the weather was not very hot. The immediate cause of death was clearly asphyxia, as all the appearances in the body showed. The softening of the medulla spinalis, which some experimenters have mentioned as being seen after death from strychnine, certainly was not found in this case.

"A post-mortem examination was made thirty hours after death. The body was well formed and plump, but very dirty, with considerable evidence of severe syphilitic disease. The left labium was greatly swollen, ulcerated, and indurated. The urine escaped through a large ulcer in the vagina, which communicated with the neck of the bladder.

"Not more than the usual post-mortem discoloration was present. There was much foam about the mouth and nostrils. There was scarcely any rigidity—less than usual in the lower extremities; none whatever in the upper arms, chest, or body; little in the thighs, hands, and feet; the legs and lower arms being somewhat rigid. On removal of integuments, the muscles seemed to be very flaccid.

"*Chest.*—The *lungs* were emphysematous, from rupture of air-cells. The posterior part of the lower lobes was congested, and rather, but not excessively, œdematous; otherwise they were quite healthy. The bronchial tubes were filled

with frothy mucus, as were the larynx and upper part of trachea, the lining membrane of which was so congested as to be quite crimson in colour. The small muscles of the larynx and glottis were more firmly contracted than those of any other part of the body. No effusion into the pleuritic cavities or pericardium.

"The *heart* was perfectly flaccid, containing, on the right side, a large quantity of dark fluid blood, with some little soft pale fibrinous clots in the ventricle; on the left side, only some small quantity of dark soft coagulum. The structure of the heart was healthy.

"*Abdomen.*—The *stomach* was distended with flatus, but containing not more than three ounces of a pale bluish-green coloured thick gruelly fluid, without any appearance of other food. Near the larger end were some few spots of extravasation in the mucous membrane, which in other parts was pale and natural in texture."

The intestines were pale, containing little except some bilious mucus and flatus. The spleen was congested; the other abdominal organs normal.

"*Head and Spine.*—The vessels of the scalp, dura mater, and pia mater, were much distended with dark fluid blood. Some serous effusion was present in muscles of the pia mater, upon the convolutions; none in the ventricles. Substance of both cerebrum and cerebellum perfectly natural, except, perhaps, having more vascular points on being sliced. Medulla oblongata firm and natural. Spinal veins congested; the medulla spinalis itself natural, except perhaps (but of this Mr. Nunneley was doubtful) rather softer than usual at the bulbous expansion about the seventh cervical vertebra.

"An analysis was made one hundred and fourteen hours after death, and eighty-four after examination, when strychnine was most decidedly detected in considerable quantity, by the method mentioned in toxicological works. The interior of the stomach was well washed with distilled water, which, being added to the contents taken from the stomach, and acidulated with sulphuric acid, was boiled for some little time, and filtered; then neutralized with lime, and again filtered, and evaporated to dryness; a portion of this residue, on being dissolved in spirit, gave, on the addition of a small quantity of nitric acid, the characteristic brown tint of strychnine."

Mr. Nunneley opines that if a dose of strychnine taken into the stomach "be sufficient to cause death within four hours, it may commonly be found; and that it does not necessarily undergo decomposition for a considerable period after death, the present case furnishes conclusive evidence."—*Association Med. Journal*, Jan. 26th, 1856.

Lard as an Antidote to Strychnine.—Dr. W. N. Pindell relates that, being annoyed by some dogs, he determined on poisoning them. A piece of meat containing one grain of strychnine was placed on the ground beside some lard. A dog was seen to eat both the meat and the lard, without being poisoned. The next night, pieces of meat were laid down with strychnine; the following morning, three dogs were found dead. In nine instances, in which lard was given with the strychnine, the animals did not die; in eleven, where no lard was given, all died. Half a grain was sufficient to produce death; but three grains failed when lard was used.—*American Journal of the Medical Sciences*, October, 1855.

The Frog Test for Strychnine.—Dr. Marshall Hall records in the 'Lancet' the results of two experiments. He dissolved one part of the acetate of strychnine in 1000 parts of distilled water, adding a drop or two of acetic acid. He then took a frog, and, having added to one ounce of water $\frac{1}{100}$th part of a grain of the acetate, he placed the frog in the solution. No effect having been produced, $\frac{1}{100}$th of a grain was added; in an hour another $\frac{1}{100}$th of a grain; making in the whole about the thirty-third part of a grain. In a few moments the frog became violently tetanic, and though taken out and washed, died in the course of the night.

A second frog was placed in one ounce of distilled water, to which the $\frac{1}{200}$th part of a grain of acetate of strychnine was added. At the end of the first, second, and

third hours, other similar additions of the acetate were made, no tetanic symptoms having appeared. At the end of the fifth hour, the frog having been exposed to the $\frac{1}{50}$th part of a grain, tetanic symptoms came on, and, under the same circumstances of the removal and washing, the frog died.

Dr. Hall thus was able to detect the $\frac{1}{50}$th part of a grain of strychnine. He adds, in a subsequent note, that in two further experiments, the $\frac{1}{500}$th and $\frac{1}{1000}$th part of a grain were detected.—*Lancet*, and *Veterinarian* for February, 1855.

Poisoning by Vapour of Carbon.—Action of the Actual Cautery as a Stimulant. —Dr. Faure, in making experiments on the effects of the actual cautery as a stimulant in cases of asphyxia, has been led to make some observations on the phenomena of asphyxia by the vapours of carbon.

A number of dogs and cats were sacrificed, sometimes in a room used as a laboratory, sometimes in a closed vessel containing about 125 cubic feet, into which the gas was introduced by means of a tube. The symptoms produced are modified by certain conditions, which are pointed out.

A. When the atmosphere is excessively hot and dry, the peculiar effects of poisoning by carbon vapour are marked; the symptoms are those of suffocation, exactly resembling those produced by sudden but incomplete impediment to respiration by a mechanical obstacle. Sometimes the animal dies in convulsions; at other times death is attended by a regular and progressive diminution of respiration. The blood is bright red, and fluid.

B. When the temperature is moderate or low, there are generally no convulsions; death takes place by a gradual impairment of respiration. The first symptom is headache, which soon becomes intense. There are almost always vomiting, and evacuation of urine and fæces. The action of the heart and lungs gradually becomes weaker; and it is not possible to determine the exact moment at which death occurs.

Cases of this kind are met with when asphyxia occurs in a room too large for the air to become much heated; when there is a fissure capable of establishing a communication with the external atmosphere; or when the vapour is evolved at a distance, and has to reach the apartment through holes in the wall, under the floor, through tubes, drains, &c. In several recorded cases, the vapours emanating from a fire at a distance have at first produced mere headache and other troublesome symptoms; and these, increasing in intensity with the repetition of the cause, on the third or fourth night have terminated in death. In another instance, recorded in the 'Annales d'Hygiène,' the fumes arising from the burning of some woodwork in connexion with the fire-place, produced symptoms of asphyxia in several persons who visited the room of a lady who had been found dying from suffocation.

Dr. Faure has often asphyxiated animals, by burning only a small quantity of carbon at a time, so that the temperature was not sensibly changed. They remained apparently well for about an hour or an hour and a half; they then began to turn round, fell down, and after a prolonged convulsive attempt at respiration, they died.

In this second class of cases, the blood is sometimes quite fluid; sometimes there are soft coagula in the right side of the heart.

Sometimes the vapour of carbon, inhaled under the same conditions, produces very different effects. One individual or one animal is killed; while another, in the same apartment at the same time, will escape, or may die under a different class of symptoms, and present different post-mortem appearances.

This is important in a medico-legal point of view. Two persons who have attempted to commit suicide by asphyxia, are found in a room; one is dead, the other is scarcely affected. The suspicion arises that the latter has murdered the former, and has found some means of preserving himself from injury. Cases of this kind have been recorded.

Some years ago, a man was found lying dead on a bed. A girl, who inhabited the same room, stated, that after a dispute with him on the previous night, he

had struck her with a knife, and that she had fallen insensible, with her face against the door. In the night, on recovering her senses, she found the man dead, and charcoal still burning. She tried to hang herself, but the rope broke, and she fell down. When discovered, she complained of violent headache and *malaise*, and felt quite stupefied.

The question in this case was, Did the girl really remain in the room all night, or did she leave it for a time, either by the door or by a trap-door which led into a garret? Dr. Faure says that, however apparently well the doors and windows of a room may be closed, there will still be a current of air from without, especially when the atmosphere of the room is heated. Again, when the hot air in a room approaches the ground, it becomes condensed, and leaves room for a powerful influx of the air from without. The girl may then have breathed, while she was lying near the door, an almost pure atmosphere, in spite of the intensity of the vapour with which the room was filled.

In the investigation of cases of this kind there is much difficulty, depending in great measure on the circumstance that persons have been found asphyxiated in rooms where an entire pane of glass was wanting in the window; while, on the other hand, a single current of air, in a favourable direction, has preserved life in a well-closed room. M. Malgaigne, in making some experiments on himself, was surprised at the absence of results, until he was able to account for them by the presence of some small chinks through which air entered.

Symptoms.—At a temperature of from 70° to 85° Fahr., that at which suicidal asphyxia most commonly occurs, the symptoms appear in the following order:

A. Headache, general *malaise*, noises in the ears, loss of muscular force, dryness of the throat, tendency to vertigo and to turn round, vomiting, and loss of consciousness. The action of the heart is at first accelerated, but soon becomes slow; there is generally evacuation of urine and fæces in abundance. The skin is quite insensible to pricking or pinching; but the least contact of a hot iron arouses the patient. The patient may recover spontaneously on exposure to the open air.

B. The action of the heart is alternately raised and depressed; the pupils are insensible to light; the conjunctivæ are unaffected by irritants; a large quantity of sanguineous froth escapes from the bronchi; there are cries and convulsive movements. Anæsthesia is still more complete; the hot iron produces no effect on the limbs and on the lower part of the body, but is still felt under the clavicles and in the axillæ.

C. The movements of the heart become more and more rare. In dogs, whose normal pulse is from 89 to 92, they decrease to 15 or 18. The thoracic movements are almost invisible; but from time to time there is a deep inspiration, generally accompanied by a groan. At last, the nostrils alone move very feebly; the entire body is insensible to the red-hot iron; and death is inevitable.

In commenting *seriatim* on these phenomena, Dr. Faure remarks on the great importance of attending to the amount of *cutaneous sensibility*, in regard to prognosis. Insensibility appears to possess two degrees, in the first of which it resists ordinary irritants, but not the red-hot iron; while in the second the hot iron is not felt. At first, the skin of the limbs may be pinched with impunity, while signs of pain may still be elicited by pinching under the clavicles or in the axillæ; and, at a later period, the application of the red-hot iron produces the same comparative effects.

The fact that the sensibility to the application of intense heat remains longest in the upper part of the chest, has been used in the recovery of asphyxiated persons by MM. Deconfrevon, Florent Cunier, Aken, and others.

There is a great difference between the action of mechanical irritants and of the red-hot iron. Dr. Faure has often removed portions of integument from the chest without producing pain, while the least contact of the cautery was sufficient to arouse the animal. Often dogs which have overturned the furnace have remained insensible on the burning carbon, and yet a slight burn with the hot iron has

made them cry out: provided, however, that the cautery were applied in the open air, for it might be applied to an animal within the gas-holding chamber without producing the least sign of consciousness.

As sensibility is lost in a direction proceeding from the extremities towards the upper part of the chest, it returns in the opposite direction. This, Dr. Faure has been able to observe by means of the actual cautery.

At the last limit, when the cautery has no action except on a very limited point, it does not produce pain, but a series of muscular movements, resulting in an inspiration; and it is only after the recurrence of several of these that signs of pain are felt.—*Archives Gén. de Méd.*, Janvier, 1856.

Softening of the Stomach: suspected Poisoning by Sulphuric Acid.—On the 28th of June, 1853, the Rev. M., a Hungarian exile, died at F——, in the duchy of Nassau, having for ten days previously been under treatment for dyspeptic symptoms, attended with gastric tenderness and diarrhœa. Shortly before, his suspicions were aroused that poison had gradually been administered to him by one of his relatives with whom he dwelt. This suspicion was increased by the circumstance that another relative had taken a portion of the suspected coffee to a physician for analysis, and that the latter had found, on chemical examination, a large quantity of sulphuric acid. In consequence of this, a judicial investigation was set on foot. In the mean time, certainly two months after the discovery of the sulphuric acid in the coffee, Mr. M. died; and a post-mortem examination was made by three physicians, who were purposely kept in ignorance of the facts above related.

The body was that of a man aged from seventy to eighty. All the cavities of the body presented evidences of senile atrophy.

In the head, there was passive (venous) hyperæmia of the membranes; the substance of the brain was hard, and the ventricles dilated; and there was extensive serous effusion both in the ventricles and between the cerebral membranes. This effusion Dr. Santlus (who reports the case) believes not to have been apoplectic, but the result of the senile atrophy of the brain, which, according to Rokitansky, gives rise to congestion and effusion in order to fill the vacant space. The quantity of the effusion was an argument against its having been the result of putrefactive changes.

The lungs had adhesions both to the pericardium and the pleura. They were voluminous, and dotted with dark-blue spots, especially posteriorly. They were crepitant, and had a soft feel, "like eider-down." At the upper part of both lungs, the pleura was in parts contracted and hard; the lower and lateral parts of the lungs were crepitant on section, collapsed, and contained only a moderate quantity of thin watery red fluid; the posterior parts of the lungs were not collapsed, and contained a large amount of frothy blood; the posterior part of the right lung sank in water. The pleura was adherent to the upper part of each lung, and was thickened; but there were no traces of tubercle or other morbid deposit.

The pericardium was healthy. The heart was of the size of a fist; its walls were thin; the valves were healthy; and the aorta was free from morbid deposit. The blood contained in the heart was dark and fluid, presenting only some small loose coagula.

On opening the abdomen, the bladder was found full of a large quantity of urine, having a strong smell. The transverse colon lay in front of and concealed the stomach. The intestines, especially the large, were full of gas. The ascending colon presented six or eight dark-grey spots on a single prominent convolution. The stomach was very soft, and tore easily, allowing a large quantity of fluid contents to escape. It was tied at the pyloric end, and removed, with about half of the œsophagus. The lining membrane of the stomach was discoloured, and easily separable. At three fingerbreadths from the cardia, on the anterior surface, was a greenish spot, which, on incision, was shown to be due to

ecchymosis. The mucous membrane, at its passage from the œsophagus to the stomach, was of a dark-red colour, extensively detached, and contained some very large dark-red vessels. This vascular development produced an appearance of dark-red spots, especially in the œsophageal part of the cardiac region. At this part was an erosion of the size of a farthing [a small kreutzer], penetrating as far as the muscular coat, and leaving a conspicuous deficiency in the mucous membrane. This was the only perforation of the kind observed in the whole stomach. In the neighbourhood of the perforation the mucous membrane appeared as if it had been burnt; the discoloration extended towards the pylorus, and ended in a dirty green-coloured spot of the size of a small hand. At the upper part, towards the small curvature, the colour became clearer, and passed into a light muddy red, showing in parts the colour of a healthy mucous membrane. Over single parts of the detached mucous membrane were scattered small, clear, red, sanguineous spots, especially in the discoloured portion already described as extending from the cardia to the pylorus. In the lower part of the cardia, corresponding to the greater curvature, and opposite the œsophageal opening, all the coats of the stomach were so decomposed that they could be broken up between the fingers, and were so thin that, including the peritoneal coat, they were not thicker than paper. The serous coat of the stomach, in general, was also much softened.

The duodenum presented no morbid appearances beyond some red spots here and there. The large and small intestines were healthy. The liver, spleen, and kidneys presented no appearance worthy of especial notice, except that the left lobe of the liver was discoloured at its lower part.

The stomach, with a portion of the œsophagus and a piece of the left lobe of the liver, were removed for chemical examination. These parts were tested successively for sulphuric, nitric, hydrochloric, and phosphoric acids; iodine, bromine, and various metals, earths, and alkalies, without finding any traces of these. Some portions of the stomach and liver were reserved, in order to be tested for organic poisons; but of the result of this examination we do not find any account.

After a comparison of the morbid appearances observed in this case with those of softening and post-mortem perforation of the stomach, as described by various pathologists, Dr. Santlus concludes in the following words:—"That poisoning, although possible, cannot be judicially proved to have occurred in the case of Mr. M., in the absence of manifestations peculiar to poisoning in the symptoms, post-mortem examination, and chemical analysis; and that the supposition of poison is further opposed by the fact that the deceased died in a state of senile atrophy, of which the softening of the stomach was only a strongly-marked instance."—*Henke's Zeitschrift fur die Staatsarzneikunde*, 1855.

Poisoning by swallowing finely-divided Hair.—Dr. A. A. Dornseiffen relates the following case:—A woman, in good circumstances, returned from Java to Holland in 1810. A short time before her return she began to feel pain in the stomach and intestines, which was increased by pressure. At first the pain was not increased by eating, but latterly the act of taking food produced vomiting. Her appetite gradually was lost; and, from being plump and good-looking, she became, soon after her return, thin and pale. For four years, the pain by day and night was insufferable, and could only be relieved by bending the body forwards. In 1844, after eating oysters, the patient had vomiting and diarrhœa; after which the pain was diminished. It continued, however, in various degrees of intensity, till 1850, when a physician determined to treat her for tænia, by decoction of pomegranate root and castor oil. In the evacuations were found a number of finely-divided hairs, from a few lines to an inch and a half in length. When these had been evacuated, the pain at once ceased, and the patient regained her former good health.

The woman remembered that, shortly before her return from Java, being ill, she had given to her by a Malay girl a drink named *jambu*; this was thick and opaque, and she did not know any other way in which she could have swallowed the hairs. She believed that she had been poisoned by the hairs of the tiger, which are said to

be used for that purpose by the natives of India. The hairs, however, on being examined, more resembled those of the mane or tail of a horse or ass, or of an animal of the hog kind—perhaps the babyroussa.—*Nederlandsch Weekblad,* Sept. 1854; and *Schmidt's Jahrbücher,* 1855.

On Oils, as promoting the Poisonous Action of Cantharides.—The solubility of cantharidin in oils has led Orfila, Taylor, Christison, Mitscherlich, Oesterlen, and other toxicologists, to promulgate cautions against the use of fatty matters in poisoning with Spanish flies. On the other hand, Clarus, in his "Handbuch der Specielle Arzneimittellehre," considers that there are no grounds for this caution. Professor Schroff, of Vienna, who has performed a number of experiments on the action of Spanish flies and cantharidin, has published the results of the administration of these substances in combination with oil. Three rabbits—two of four and six months old respectively, and one full-grown—had the poison given to them. To the first was administered $15\frac{1}{2}$ grains of powdered cantharides, rubbed up with olive oil; to the second, $7\frac{3}{4}$ grains, prepared in the same way; and to the third was given $1\frac{1}{2}$ grain of cantharidin, similarly prepared; to each were also administered several table-spoonfuls of olive oil. The results, compared with cases in which the poison was given without oil, were the following:

1. The symptoms during life were identical in both classes of cases.
2. Death occurred soonest in the cases in which oil was given. Fifteen grains of cantharides with oil caused death in four hours; without oil, in five hours. Seven and a half grains with oil destroyed life in nineteen hours; without oil, in twenty-six hours. One and a half grain of cantharidin, with oil, killed the animal in four hours; without oil, in from seven to ten hours.
3. The post-mortem appearances give evidence of less action of the poison on the parts with which it comes in contact, where oil is given, than when the poison is taken alone. In the three rabbits poisoned as above related, there was no vesication of the tongue; and the inflammation of the stomach and intestines was less than in cases of the other class. On the other hand, the signs of inflammation of the urinary system were more strongly marked where oil was given. The bladders were contracted and empty; the kidneys were much injected; and the urinary mucous membrane presented on its surface a large quantity of epithelium, nuclei, and blood-corpuscles.

The practical deduction from these experiments is the confirmation of the prohibition of the use of oil in cases of poisoning by cantharides.—*Wochenblatt der Zeitschrift der K. K. Gesellschaft der Aerzte zu Wien,* Nos. 48 & 49, 1855.

On Poisoning by Turpentine Vapour.—M. Marchal de Calvi related to the Academy of Sciences in Paris, on December 10th, the case of a woman who had lived for some days in a newly painted room. The first symptom she experienced was colic, but soon she became prostrated; the face was deadly pale, the eyes sunken, the lips could scarcely be moved, the breath was cold, the voice was lost, the limbs were cold, the pulse almost imperceptible, the countenance anxious. The intellect, however, remained perfect, and the patient felt as if she were about to die. Under the use of external and internal stimulants she rallied, but did not perfectly recover for a month.

Some experiments made by M. Marchal in conjunction with M. Mialhe, tend to show that vapour of turpentine produces poisonous effects on men and animals. The conclusions at which the author arrives, are: 1. That white lead is fixed in paint, and is in no way concerned in the production of the poisonous symptoms arising from inhabiting a newly-painted room. 2. These symptoms are due to the vapour of turpentine. 3. The danger is the same whether the base of the paint be lead or zinc. 4. There is danger of poisoning by turpentine so long as the paint is not perfectly dry, and it is safest not to inhabit a newly-painted room until all smell has disappeared. 5. Poisoning by turpentine enters into the same category as poisoning by the emanations from flowers. 6. The emanations from

flowers act in two ways—idiosyncratically or as poisons. 7. The action of turpentine is chiefly depressing. 8. Energetic stimulation constitutes the best treatment. The peristaltic action of the bowels should be excited. The two last observations, being formed on insufficient data, are not absolute.—*Gazette Médicale de Paris*, December 20th, 1855.

Poisoning by Sulphuret of Carbon among Workmen in India-Rubber Manufactories.—At the meeting of the Academy of Medicine in Paris, on January 15th, M. Delpech stated that he had arrived at the following conclusions with regard to the workmen in India-rubber manufactories.

1. That such workmen are liable to accidents, which consist in (*a.*) loss of appetite, nausea, vomiting, diarrhœa, or constipation; (*b.*) disturbance of the intellectual functions, hebetude, loss of memory, extreme restlessness, and unaccountable violence; (*c.*) more serious disturbance of the nervous functions—cephalalgia, vertigo, disturbance of sight and hearing, impotence, and various forms of paralysis.

2. That experiments made on men and animals, who are affected in the same way, lead to the conclusion that the symptoms are due to the inhalation of the vapour of sulphuret of carbon.—*Gazette Médicale de Paris*, January 19th, 1856.

Antidotes for Salts of Copper.—Dr. Scharder of Göttingen has recently conducted several experiments in relation to antidotes for copper salts. *Hydrated proto-sulphuret of iron*, which is recommended by M. Mialhe, did not prevent the death in the night of some rabbits, although given in sufficient quantity to decompose the three and six grains of acetate of copper which had been administered. The sulphuret alone was alike inactive in rabbits. The autopsy of the rabbits only showed that the heart and great bloodvessels were filled with liquid black blood. *Hydrate of magnesia*, contrary to the results obtained by M. Roucher and others, was not found efficacious. *Sugar* had the same negative results. *Prussiate of potassa* was tried in several cases on dogs and rabbits: the results appear doubtful. *Albumen and milk* taken in excess provisionally neutralize the poisonous copper salts; but the caseate or albuminate of copper formed must be purged off.—*Deutsche Klinik*, No. 4, 1855, and *Chemist.*, June, 1855.

Poisoning by Gamboge.—A delicate Parsee female, aged nineteen, took about three drachms of pipe gamboge for the purpose of self-destruction. Five hours afterwards she was collapsed from the violent purging and vomiting, which commenced about two hours after taking the drug. The matters ejected were of a deep yellow colour, and the pain and suffering very great. Stimulants were given and frictions employed, and the collapse passed off; but the straining, griping, and evacuations of yellow mucus continued for some days. She ultimately recovered.—*Transactions of the Medical and Physical Society of Bombay*, 1855.

II. Miscellaneous.

Suicide and Suicidal Mania.—M. Brierre de Boismont has published an interesting work on 'Suicide and Suicidal Mania.' After a notice of the doctrines of the ancients regarding the practice of self-murder, he proceeds to speak of its causes, its physiological and symptomatic characters, nature, and treatment.

Predisposing Causes.—Among these are hereditary tendency, especially with the insane; also climateric and meteorological influences. Suicide is more common among males than females, and in large centres of population than where the people are thinly scattered; it is, however, frequent enough in rural districts. It occurs at all ages, very rarely in youth, most frequently at the age of from thirty to fifty. Contrary to the doctrine of Esquirol, suicide takes place also in old age. It is more frequent in unmarried and widowed persons. Certain pro-

fessions and education, and still more poverty and immorality, favour the tendency to it.

Exciting Causes.—These are drunkenness, want, misconduct, insanity, domestic grievances, love, gambling, pride, *ennui*—the latter being a sign of an antiquated and palled civilization. In the early ages of our era, Seneca and St. Chrysostom pointed out the tendency to suicide arising from a disgust of life; and in the present age, Rousseau, Goethe, Chateaubriand, and Lamartine reveal in their works the same state of feeling. And not only are restless and dreamy minds—poets and artists—subject to *ennui*, but even such men as Dupuytren and Napoleon have experienced the feeling. In opposition to Esquirol, M. Brierre holds that *ennui*, even with a tendency to suicide, does not constitute insanity, unless there is manifested derangement of the moral and intellectual faculties.

Last Sentiments of Suicides.—Some commit suicide coolly and resolutely; others only after repeated hesitation. Very few resist the desire to make known their feelings at the time of leaving the world. The social feelings are manifested in adieux to families and lovers. Many suicides acknowledge themselves the authors of their own death, and explain their motives for the act. Some express pain at not having been able to overcome bad habits; they leave to their enemies messages of forgiveness and reconciliation; and give directions regarding their funerals. Others utter bitter regrets of life—complaints, recriminations, insults, threats. Sometimes the writings found after death show that the reason for suicide has been most trifling; in others insanity is apparent. Among the sane, the motives assigned are taken from passions, desires, regrets, &c.—in a word, from ordinary phenomena of life. With the insane, the tendency to suicide is manifested by hallucinations, illusions, delirious ideas—by, in fact, a true diseased state.

The number of suicides is greatest in Paris, and greater in large towns than in rural districts. In France, there is one suicide in every 13,461 inhabitants; the number is at its maximum in the north, decreases in the east, west, and centre, and is least in the south. More suicides are committed by day than by night, and more in summer than in winter.

Physiological and Symptomatic Characters of Suicide.—In sane persons, suicide is in youth almost always instantaneous, and is determined by emotions. Melancholic characters are most predisposed to it. In adult and old age, the signs of a suicidal tendency are derivable from the character of the individual, his temperament, ideas, education, profession, organization, and degree of sensibility or irritability. The expression of the countenance often reveals the fatal resolution. A first attempt at suicide is no guarantee of its non-recurrence.

In the insane, the temperament, character, antecedents, and hereditary tendencies must be taken into account. Most suicides are committed under the depressive form of insanity—as in melancholia. Hallucinations and illusions are very common: such as the notion of having enemies; of being poisoned or persecuted; exaggerated dread of hell, of the police, imprisonment, judgment, &c. The refusal of food and drink is often associated with the notion of poison. Lesions of general and cutaneous sensibility exist in a large number of insane suicides. Suicide is sometimes acute. It may be preceded by homicide: it may arise from irresistible morbid impressions. In the insane addicted to suicide, science may effect a tolerably large proportion of cures.

Nature of Suicide.—M. Brierre de Boismont seeks to show that suicide is often a voluntary act, maturely reflected on and coolly executed, in perfect freedom of mind. In discussing the influence of ideas and beliefs, he cites the instances of a large number of celebrated men who have thought of suicide, and have gone so far as to commence its commission; but he by no means excludes the influence of insanity in producing this kind of death.

Treatment.—In the sane, religion, morals, the performance of duties, and a wise control over the passions, are the best preventives. The avoidance of sadness, the possession of a family, and the exercise of a profession, are for youth the best means of combating the suicidal tendency. Reasoning, moral measures, and amusement, may be successful in adult age. Solitude is often a cause of suicide in the old,

and the tendency must be removed by surrounding the individual with a family. Imitation—a sort of moral contagion—contributes to suicide: hence entertainments and books which treat of it should be avoided. Punishment appears to have no effect on suicide, especially among civilized nations. M. Brierre thinks that confession and the cloister have rescued many from the committal of suicide.

In the insane, the tendency to suicide must be combated by isolation, therapeutic agents, and coercive measures. Prolonged baths and repeated shower baths are generally indicated in suicidal maniacs. Cold affusions, tonics, antispasmodics, dry friction, bleeding, blisters, &c., may be also employed with advantage. When food is refused, it is sometimes necessary to administer it through an œsophageal tube. At the period of convalescence, a visit to the country, travelling, amusements, gymnastic exercises, and intellectual and manual labour, hasten and perfect the cure. Recovery from suicidal mania may be due to a physical or moral crisis. A diversion of the moral feelings may produce a cure in some cases where the disorder is stationary. Children born of suicidal parents require to be subject to a preservative treatment, consisting in a special intellectual education, directed with wisdom and perseverance by proper persons.

The acute period of suicidal mania being once passed, *family life* is of great service. By the term family life, M. Brierre means, not the return of the patient to his own family, but the assembling of patients of both sexes, under the constant inspection of one of the chiefs of the establishment. This intimate and familiar life, presenting as it does almost the normal appearance of society, has great advantages, especially with melancholic monomaniacs, over measures of seclusion. Persons engaged in the treatment of the suicidal insane should recognise as their objects—the exercise of a constant influence over their patients by reasoning, advice, and exhortation; the fulfilment towards them of the duties of the consoler and the friend; and the continued manifestation of marks of interest, benevolence, sympathy, and devotion. These functions do not require high mental qualifications so much as the possession of good moral qualities. This course of treatment results in arousing the patients from their morbid ideas, and in bringing them back to the realities of life; and by it M. Brierre has obtained permanent cures in cases where all other means had failed.—*Gazette Médicale de Paris*, February 23rd, 1856.

Death by Hanging: Question as to Period: Evidence afforded by post-mortem Changes.—The following case elicited some difference of opinion among medical jurists:—Duroulle, a person who had studied medicine and law, and who lived in a village in Normandy, was accused of having, by the aid of his maid-servant, with whom he lived in concubinage, caused the death of his wife by strangulation. He had frequently ill-treated his wife, who had, notwithstanding, made a will in his favour. On February 27, 1854, at about 9 P.M., according to the statement of the accused persons, Madame Duroulle, after a slight altercation with her husband, went into a garret; and in a short time a noise was heard as of a heavy body falling on the floor. A girl named Neveu, the accomplice of Duroulle, went up, and found Madame Duroulle lying on her face on the ground. On raising her, she discovered that she had a cord round her neck, and was dead. Duroulle placed the body on a mattress, removed the cord, and sent for the mother of the girl Neveu, and for a physician.

It seems to have been ascertained that the cord was one used for drawing curtains together; that one end of it was attached in the garret at a height of one mètre and eighty-five centimètres (about two yards) from the ground. Two ends of the cord—broken, according to some witnesses,—cut, according to others—hung from the pulley, at a distance from the ground of one mètre and forty-five centimètres (somewhat more than a yard and a half). Immediately beneath, there lay on the ground a small quantity of fæcal matter, and of urine which had not been absorbed.

In the indictment, it was asserted that Madame Duroulle had died, not on the 27th, but on the evening of the 26th. Witnesses stated that at this time they had heard cries of distress in the interior of the house. Duroulle was accused of

having strangled his wife, and of then having kept the body clothed and covered, so that on the evening after death it retained traces of warmth.

M. Devergie, who gave evidence on part of the defence before the Imperial Court of Rouen, stated it as his opinion, that the death of Madame Duroulle had been caused by the application of a cord round her neck; that the event took place on the 27th February; and that the appearances denoted that she had committed suicide.

On the other hand, M. Tardieu, with the same evidence before him, arrived at the following conclusions:—1. The death of Madame Duroulle could not be certainly and exclusively attributed to hanging. 2. There was no positive proof of suicide; but the state of the body gave more than one reason for believing that the act of suspension had been performed by other hands. 3. The appearances presented by the body, especially the want of rigidity and the partial cooling, would in no way warrant the supposition that she had died recently when the body was first examined. On the other hand, these appearances would serve to denote that death had occurred at an earlier period. He believes that the body may remain warm for twenty-four hours and longer. Cadaveric rigidity may set in when a high degree of warmth is still present, and may last for so short a time as to entirely cease before the body is quite cold.

M. Devergie asserts that the post-mortem phenomena constantly follow in the same order, differing only in the rapidity of their course or their duration. This fixed order, according to him, is:—1. Progressive diminution and loss of warmth. 2. Cadaveric rigidity. 3. Cessation of rigidity and relaxation of the muscles. 4. Putrefaction. The circumstances under which the period and degree of these vary are chiefly connected with the kind of death and the atmospheric temperature; and, in certain given cases, it becomes possible to solve the following problem:—One of these phenomena being present in a case of hanging or strangulation, to determine the period at which death took place. At the time of Madame Duroulle's death, the weather was cold; and yet, on the evening of the 27th, her body was still warm, and there was but little cadaveric rigidity. Hence, M. Devergie concluded that she could not have been dead for twenty-five or thirty hours.—*Journal de Médecine et de Chirurgie Pratiques*, August, 1855.

On the Hydrostatic Lung-Test.—At a meeting of the Société de Biologie of Paris, in August, 1855, M. Blot communicated some facts in support of an assertion which he has several times made—that the hydrostatic test is insufficient, in some cases, to distinguish the lungs of children born alive from those of still-born infants.

A rhachitic female gave birth, at the seventh month, to a child which was apparently dead, but which was resuscitated by artificial respiration and the other means usually employed. After twenty minutes, the respiration, from being irregular, became regular, and was performed in the ordinary rhythm for an hour. The inspiration, though incomplete, was sufficient to maintain life; the expiration was noisy and plaintive. At the end of an hour, the breathing ceased, but the action of the heart continued for some time longer.

On opening the chest, the lungs were found collapsed, lying along the vertebral column; their anterior edges were turned outwards. The pericardium and thymus lay uncovered in the median line. The lungs scarcely filled two-thirds of the chest; they were of a brown colour, like an adult liver, and did not crepitate when pressed between the fingers.

When placed in water, the lungs, whether entire or in portions, sank rapidly to the bottom of the vessel. On pressing between the fingers a portion which had sunk in water, extremely fine bubbles of air escaped, without giving the least sensation of crepitation.

On the surface of the lungs were seen (especially anteriorly) some pulmonary cells lying under the pleura. These cells apparently did not crepitate, and sank in water; their colour, although less deep than that of the rest of the lungs, was brown.—*Gazette Médicale de Paris*, November 3rd, 1855.

HALF-YEARLY REPORT ON MICROLOGY.

By John W. Ogle, M.B. Oxon., F.R.C.P.
Curator of St. George's Hospital Museum, and Physician to St. George and St. James's Dispensary.

Part II.—Pathological Micrology.

BLOOD AND BLOODVESSELS.

Enumeration of Blood-corpuscles.—Pury, of Neufchatel, relates a case of leukhæmia,* in which the blood was examined at four separate times within the space of ten weeks.

In the first examination the colourless corpuscles were as			142·8 to 1000.
In the second ditto,	„	„	83·3 to 1000.
In the third ditto,	„	„	45·7 to 1000.
In the fourth ditto,	„	„	52·6 to 1000.

The blood of the splenic, jugular, and portal veins, was found to be coagulated, and of a greyish-yellow colour, and contained a large number of colourless corpuscles. In the splenic they were as 52·6 to 1000, in the jugular as 25·0 to 1000, confirming the observations of Funke, Kölliker, Moleschott, Vierordt, and Welcker, who found the splenic blood to be richer than other veins in the colourless corpuscles. It will be remembered that Moleschott considers the proportion of colourless to red corpuscles in healthy ordinary blood to be as 2·8 to 1000.

Cases of leukhæmia are also detailed by Heschl of Krakau,† and by Dr. Wallace of Greenock,‡ which, however, we can only thus advert to.

On the Pathological Condition of the Smaller Cerebral Vessels.—Under this title we have an Inaugural Dissertation at the University of Würzburg, by H. Mosherr, 1854. He first describes the physiological condition of the cerebral capillaries, as described by various authors, noticing the frequent separation of the outer coat from the others, which may be owing to the interposition of pathological products, or only the result of the addition of water. He then considers the fatty degeneration of the vessels, recurring to the descriptions of Paget, Virchow, Brummerstadt, Hughes Bennett, Rokitansky, Wedl, &c. He takes exception to the opinion of Bennett, who considered the fatty particles connected with vessels about apoplectic clots to be indicative of inflammation. The author had examined twenty-eight cases of fatty degeneration, in various degrees; he describes the general widenings, or only partial swellings out, in both of which cases the opposition to the stream of blood is diminished. Oftentimes the partial swellings are occasioned by accumulations of fat being formed between the structureless and the inner membrane, apart from the formation of yellow golden pigment, owing to the rupture of the inner membrane, whence they were designated by Pestalozzi, in 1849, "spurious aneurysms." The peculiar necklace-like appearance assumed by these arteries often, is either owing to regularly succeeding widening of the whole calibre, or by the pressure of fat heaps inside the adventitious tunic, which is often so thin that slight pressure suffices to burst them, and squeeze out the fat. Where the degeneration of the small vessels begins is a very difficult question. It can hardly be said whether the granules belong to one coat or the other, and this is owing to the transparency of the elements, and the impossibility of distinguishing the limits of the single cells. In larger vessels, and in advanced life, one recognises the middle tunic as the degenerated part. In some cases observed by Virchow and the author the outer coat contained much irregularly divided fat, the muscular coat had fat granules, in part more disseminated, in part arranged in pearl-like rows, so that the elongated nucleus of the fibre-cell appeared free, the rows of glittering molecules being

* Virchow's Archiv, p. 280. July, 1855.

† Ibid., p. 353. ‡ Edinburgh Monthly Journal.

limited by the cell walls. In allusion to the view of Virchow, that there might be fattily degenerated areolar tissue bodies, the author said he had never observed any central grain in the conglomerates, and again the areolar tissue is very sparing about the smaller vessels. At one time the arterial, at another time the venous system was affected, but the former chiefly; in some cases both were equally affected. The arteries and veins of the grey matter were more free from the disease than those of the white part.

After giving a table, showing the enlargement of arteries and capillaries in eclampsia and encephalitis, the author ends by relating a case of varicose ektases, in which the brain on section presented bloody points like extravasation, which were found to be vesicles filled with blood corpuscles; their walls were thin and nucleated, and were continuous with capillaries.

Form of Metamorphosis of Nerve and Muscle into Areolar Tissue.—A paper with this title appears, by Dr. Billroth.* After alluding to the observations of Blunette and Schröder van der Kolk, on the changes which muscle and nerve undergo in the neighbourhood of carcinoma, he goes on to speak of this change occurring, not as a specific carcinomatous degeneration, but essentially as a transformation of the muscles and nerves into areolar tissue. In hard carcinoma of the breast it unites intimately with the fascia of the pectoral muscles, and this again with the muscular substance itself, so that the muscle is drawn into the mass, and from the first point of growing together is arranged in a radial direction. One still distinguishes the fascia a long time after this growing together has taken place; but at a later period the tissues form such a firm cicatrix that one can, neither by the naked eye nor microscope, distinguish any of the original elements. The muscle passes right into the tumour, loses its dark red colour, and at last assumes a white glittering colour, but often the bundle-like arrangement is preserved. The like occurs in cancer of the lip. In investigating microscopically these spots of transition, a very careful tearing is required. First of all, a number of small cells and nuclei come into sight, and the muscular fibre is found to be very brittle, easily tearing transversely where the fibres immediately pass into the carcinomatous cicatrix, but one seldom can follow a free fibre very far. The muscular fibre first becomes less cross-striped in places assuming a more homogeneous and stringy appearance, and at the same time a new formation of tolerably dark oval nuclei arises in or under the sarcolemma of the fibres, which take on a completely homogeneous glittering look. Whilst this change is progressing, new cells are formed between the fibres, and the tissue becomes so coherent that single fibres can only seldom be recognised, and the substance thus formed is no longer cleavable like muscle, but friable. The newly-formed nuclei compress the muscular substance, and afterwards appear to dwindle as the substance arising from the metamorphosis becomes much less nucleated than it was during development. The fore-mentioned process is the one most frequently met with, but yet there are many variations; for instance, the fibres may maintain their breadth, losing their cross-stripes, they may assume a fine punctate bright appearance, with only a scanty formation of nuclei. In other cases the covering is filled with such a mass of nuclei that it appears as if the muscular substance passed into the new formation, and perhaps itself served as a material for new formation. But these forms are seldom proportional, and may possibly be a deception, as this material does not correspond to single fibres, but only depends upon the coherence of the nucleated and cellular material deposited between the muscular fibres, which on mechanical grounds also assumes a cylindrical form. Along with these nuclei one sees a good number of fine spindle-cells, unaffected by acetic acid, which must be regarded as proceeding out of the cells deposited between the muscular bundles. This metamorphosis of muscular fibre is not peculiar to the neighbourhood of cancer. The author relates a case of a boy, part of whose lip was excised in the Berlin Hospital, for the removal of a tumour, and the labial muscles adhering,

* Virchow's Archiy, p. 260. July, 1855.

the rete were found to be metamorphosed into strong nucleus-holding areolar tissue and elastic fibres. In other cases, such as the diffuse cavernous tumours, the transformation of muscle into areolar tissue may be seen.

Just as it is with muscular fibre, so do nerve fibres pass into a kind of matrix, whilst elongated nuclei form in their sheaths. A firm cancer was removed from the mamma. It had grown into the pectoral muscle, which was removed with it. At the place of transition of the sound muscle into the tumour, in a portion kept in acetic acid for twenty-four hours, an abundance of nerves more clear and numerous than usual was seen. In a thick nervous trunk, ray-like extensions of the primitive fibres in a lateral direction were seen which, partly single, and partly united with small secondary branches, proceeded into the muscle. Here and there the bright-dark contours of the primitive fibres were seen, but for the most part the nerve substance had passed into a kind of matrix, and only a row of nuclei placed alongside each other indicated the original course of the fibre. One clearly sees in single places that the nuclei were imbedded in the sheaths of the nerve fibres, which were also in great part destroyed by reagents. This degeneration was advanced also in the neurilemma of the larger nerve branches. Our author considers that the pain often felt in cancer of the mammæ arises from the above-described new formation of nuclei in the sheaths of the primitive nerve fibres, by which the nerves are manifestly exposed to great pressure; and this the more likely, as the cancerous growths are almost free from nerves themselves. Probably something of this kind occurs in the fibroids of the skin and periosteum. The substance resulting from the above degeneration of the muscles and nerves becomes brittle, and swells up on maceration in weak acetic acid, as also in weak alkalies, being therefore not completely analogous to ordinary areolar tissue.

On the Dracunculus of Bombay.—Mr. H. J. Carter had his attention drawn to the subject* by seeing a boy, aged four, suffering from the guinea worm in the hospital of the Central School—a very rare occurrence in this school. He had lived in a house close to the School of Industry, of which his father was superintendent sergeant. His mother had a guinea worm in her ankle; other people in the neighbourhood were affected by them, and twenty-one out of fifty of the boys in the School of Industry had been affected in the past year. In all who had been affected the worms had come out from the knee downwards. The boys were living in an enclosure taken in from the shore, and were supplied by two wells, one for bathing, the other for drinking. Mr. Carter, who, in examining the various confervæ from different tanks in Bombay, found minute worms resembling the young of the guinea worm, determined to examine some of the silty confervæ from the pit where the boys bathed, and found it to contain numbers of this worm, besides other animalcules. These worms almost exactly resembled the young ones removed from the leg of one of the schoolboys, and may be described as follows, one description answering to both for the most part:—They were slightly diminishing towards the head, which is sub-pointed, not presenting the papillæ seen in the fully developed animal, even when seen under the microscope. Posteriorly they diminished in breadth a little in front of the junction of the middle with the posterior third, down to an almost imperceptible end. They were colourless, and filled with a granular material, disappearing towards the head and tail, which were thus transparent. In size the young guinea worms were $\frac{1}{33}$rd of an inch in length, and $\frac{1}{633}$rd in breadth, and the tank worm was equal to and less than the guinea worm. In vol. 1 of the Journal, Dr. Forbes had stated that he had found an animalcule in the mud of the tank about Dharwar exactly resembling the young guinea worm; and to further test the probability of the tank and guinea worm being alike, Mr. Carter examined with the microscope the confervæ in the tank of the Central School, which was like that in the well of the School of Industry, but he found no portion of a single worm of the characters mentioned; whilst dra-

* As related in the Transactions of the Medical and Physical Society of Bombay, p. 45. 1853–4.

cunculus is so uncommon in the Central Schools, that there have only been three cases in the last eight years, and these doubtless contracted during visits to friends, the guinea worm requiring a whole year for its development. The tank of the Central School is supplied by the rain falling during the monsoon. The author deduces the following inferences:—

1st. That the dracunculus may follow bathing in water where the tank worm is found.

2ndly. That it is bathing, and not drinking the water, which gives the dracunculus—the worm finding its way by the pores of the skin.

3rdly. That it may easily be exterminated.

Dr. Forbes has proved by an experiment that gastric juice is fatal to the young guinea worm; he gave the young of a guinea worm in water to two young pups, and found on examination a short time after that all were quite dead. They also die as soon as the water in which they are, putrefies, or becomes dry. Though the tank worm must during the hot weather be confined to the tanks, after the commencement of the rains, mosses and algæ on old walls and trees are found to contain the same kind of worm. Hence it probably exists generally during the rain, though more in some localities than others. The author adds a description of the adult female guinea worm.

Progressive Atrophy of Muscular Fibre.—Virchow* relates at length a case of a man, aged forty-four, who was affected by progressive muscular atrophy. He had been affected, when aged twenty-one, with almost complete lameness of the extremities, supposed to be of rheumatic origin. His father had been similarly affected when aged forty. In this case the lameness began in the legs and spread upwards. The intestines and urinary bladder remained natural until his death. The muscles of the extremities were very emaciated, and of a pale reddish-yellow colour, some being entirely degenerated. Under the microscope they exhibited areolar tissue and fat-cells containing granular material, partly corresponding to the old muscular bundles in an uninterrupted way, partly not so. In some muscles the microscope also showed the presence of slender vesicles of 0,009—0,01 millimetres broad, containing very small fat-corpuscles. Here and there were elongated nuclei, and in some places small round nuclei, showing a double contour on addition of acetic acid. These were partly single and partly heaped together from 2 to 7 in number, partly in files. These vesicles at times appeared quite isolated, with round extremities, and many had a more candate character. In other places, where the muscle was redder in colour, the vesicles were broader, containing more numerous granules, mostly oval, and of 0,075 millimetres in length. The signification of these structures was difficult to decipher. Often there were evident fat cells, surrounded by a membrane entirely uplifted from the fat drops, and with an oval nucleus. Areolar tissue bundles existed, with spindle-shaped very delicate corpuscles, which were mostly connected at their extremities; also spindle cells, broader, and filled with fine fat granules, which gradually became larger, and finally passed into large oval cells, containing large fat drops as well as the fine granules.

Finally, there were decided fat cells, only differing from ordinary ones in that along with a large fat drop they contained many smaller ones. Hence it appeared to Virchow that a new formation of fat-cells had taken place out of areolar tissue corpuscles. Where the muscle was still more unaltered, the primitive bundles were delicately pale, with finely granular contents and incomplete striæ. The arteries of the diseased muscles had fine granular fat in their walls. The nerves contained less fibres than usual, and on longitudinal as well as transverse section very broad intervening spaces were seen occupied by a very richly nucleated tissue; the nuclei were long, delicate, something pointed, almost like nuclei of organic muscle fibre, and in every direction much finely-granulated fat existed. The various nerves did not appear atrophied to the naked eye.

The spinal marrow, as well as the roots of the nerves, were healthy in look, but

* Virchow's Archiv, p. 537. Oct. 1855.

on section, even to the naked eye, a remarkable variation was seen, beginning at the upper cervical region and proceeding downwards, becoming gradually more marked, and most remarkable about the lumbar swelling. In all these places one saw in the posterior fibres of the chord, and more decidedly, near the posterior longitudinal fissure, a clearish grey, somewhat translucent mass, instead of the white nerve substance, which so extended into the under part of the medulla as to reach the posterior horn of grey substance. Here it so united with the grey matter that an obvious limit could not be seen. In general the degeneration began at the posterior longitudinal fissure, and proceeded thence into the substance of the posterior fibres. As seen by the microscope, only the posterior fibres, and not the horns, were affected. The change was of the same nature as that in the peripheric nerves, only that some broader nerve-fibres existed grouped together, which on transverse section were separated from each other by a distance of 0,005 to 0,012 millimètres. Between them existed a very soft friable granular material, containing thickly-strewed corpora amylacea, and also many granulated nuclei, chiefly oval, and here and there enclosed in round elongated cell membrane. No fat was visible, and the bloodvessels had a natural look. On the addition of chromic acid, instead of finely granular substance, much shreddy, firm and fine fibrillated material was seen.

On Mucous Polypi of the Antrum of the Jaw. By H. Luschka, of Tubingen.*— After entering minutely into the anatomy of the mucous membrane lining the cavity, in which he takes exception to the views of Todd and Bowman, who consider the periosteum lining its cavity to be in fact a sub-mucous areolar tissue, he speaks of the presence of the mucous glands, which are said by authors to be absent. In many glands the main tube, as well as the adjoining ones, possess bulgings out in the adult, and it is the presence of these bulgings which Luschka considers to be the most frequent cause of the cysts often found in the antrum. The cyst formation which is so frequently found sessile or pedunculated must be distinguished from the soft productions known as hypertrophies of the mucous membrane. The sunk cysts contain a sago-like material, partly soluble in potash, and consisting of a fine molecular mass, free fat, aggregated fat globules, and a few round cells. The more external cysts contain, along with a clear fluid, yellow cheese-like masses, in which, along with other components, fat crystals and corpora amylacea are often to be seen. In the smaller cysts one may, by the use of alkalies and acetic acid, peel off a pellicle, which in most cases may be considered the altered gland membrane. In the larger cysts there exists a wall composed of connective tissue elements in various stages of development, which contains on its inner surface an epithelium of flat and round cells, incomplete and fattily degenerated. So-called soft polypi, less frequent than the cysts, are found growing from the mucous membrane, which are to be considered as growths or hypertrophies of the sub-mucous areolar tissue, having either a spongy areolar tissue inside, or a framework enclosing irregular spaces filled with a gelatine-like substance. Luschka had found these at least five times in sixty bodies, and they generally had a clavate or pear-shaped form, sometimes a flat lobular form attached by their broad end, and generally from ½ to 2 centimètres long. These polypi were so situated generally as to barricade completely the opening of communication with the middle nasal fossæ, and so cause an accumulation of the mucus. Generally speaking, only a single polypus is found, but on one occasion six were found, which, along with a number of cysts and tough mucus, filled the antrum.

On the Animal Starch and Cellulose Question.—Virchow† has given the results of further investigations on this subject. He divides the substance into true and false corpora amylacea, relying on the reaction of iodine and sulphuric acid, and on the fact that the true corpora amylacea are not soluble in hot alcohol, æther, &c., and are destroyed by concentrated acids and alkalies. Among the false bodies

* Virchow's Archiv, p. 409. Oct. 1855. † Ibid., vol. iii. Heft 1.

he classes:—1st. The brain-sand, probably the same which Busk described as being found in the corpus callosum, and which was coloured externally of a yellowish-red hue by iodine. 2nd. Various gelatinous and albuminous grains spoken of as colloid-grains in certain tumours. 3rd. The concentric epidermal globules often found in the thymus gland and cancroid tumours. 4th. The bodies found in coagulated blood described by Gulliver, Gerber, and Hassall. 5th. The medullary matter described by Virchow himself on a previous occasion. 6th. The leucine grains obtained from extract of milk.

According to Virchow the following are the places wherein true amyloid degeneration is certainly to be found. They are—1st. The nervous system. Besides the fore-mentioned parts, the spinal ligament of the cochlea, and many parts of atrophied brain and spinal marrow, show it. He had found it in the gelatinous and cellular softening of these structures, and he mentions its discovery by Busk in one case almost throughout the brain and the choroid plexus; by Willigk in cicatrices of brain; and by Rokitansky in atrophied parts of brain and other structures. 2nd. In the spleen. In the follicular cells and pulp, the thickened walls of arteries, especially circular fibres, and in the trabeculæ. 3rd. In the liver. In the waxy degeneration, chiefly in the cells, but also in intervening tissue. 4th. In the kidneys, which are pre-eminently the subject of the degeneration. The Malpighian bodies and the arteries leading to them become first affected; then the areolar tissue in the neighbourhood of urinary tubes of papillæ; and then the other parts. Virchow says, that in most organs where they are found we have undoubted changes of the tissue elements, and that probably there is a "conversion into vegetable matter."

These starch bodies, chemically as well as morphologically, are very allied to starch bodies of plants. Busk says he has often seen in the smaller ones a dark cross by polarized light, whose arms intersect each other in the middle of the grains at an angle of 45°, the majority only showing a simple dark line. It seems necessary to guard against error by the remembrance that in several false amylaceous bodies a yellowish-red colour, called by Meckel iodine-red, is found by addition of iodine; and this is the case also with all blood-holding parts. The later addition of sulphuric acid will be requisite to determine the presence of true amyloid substance. This yellow or iodine-red appearance is compared by Busk to the appearance produced in unripe cellulose, such as is wont to occur in the lower plants. But in plants we have quantities of cellulose mixed with gelatinous substances, so that in the treatment with iodine and sulphuric acid we have all sorts of immature colours, indicating a mixture of blue and red, brown and yellow. Such a play of colours takes place in the spleen, specially in the amyloid substance from the pulp and follicles, but in no case does the blue or blue-red come forward with such clearness as in the Malpighian bodies and afferent arteries of the parenchyma of the kidney. Our author concludes that sooner or later the albuminous substance of the tissues disappears, and is replaced by amyloid substance. In those instances where the substance differed still more from starch proper it becomes more like cellulose proper; and the organs affected show that peculiar look called waxy or lardaceous. This same idea is acknowledged by Virchow to have arisen also at Edinburgh independently of himself. Generally the indurated organs are enlarged, leaving no doubt of the deposit of new matter. The co-existence of the same alteration in the spleen, liver, and kidneys leads naturally to the recognition of a common cause, a constitutional disturbance.

Since the above was written by Virchow in the 'Archiv,' he has made another communication on the same subject; but before speaking of this, we will mention a communication made* by Mr. Carter, entitled the "Extensive Diffusion and Frequency of Starch Corpuscles in the Tissues of the Human Body." In this, it will be seen, a different view is maintained on certain points. This observer saw the starch bodies in a tumour involving the optic nerve, and also the pinal gland

* Edinburgh Medical Journal. August, 1855.

of man and sheep; and, since then, made extensive experiments, examining in succession thirteen human bodies out of the clinical wards of Professor Bennett, of Edinburgh. He met with two kinds of starch, one resembling wheat, the other potato starch; and he found them in the liver, spleen, kidneys, brain, pancreas, mesenteric glands, suprarenal capsules, Pacchionian bodies, mesentery, lungs, ovaries, scrofulous matter, pus, urine, epidermis, blood, and other places, in organs as well healthy as diseased. In one case he found them around an apoplectic clot, but could not find them in any other part of the brain. In a case of diabetes, the other organs presented an unusual amount, but the liver was *free* from any. He never seems to have found them in the muscular structure of the heart. In the sheep, oxen, and lower animals, they were found in the same indiscriminate way; and the author says that they have hitherto been mistaken for fatty oil globules, to which, from form and refractile powers, they have much resemblance. He considers them as of physiological, not of pathological interest, being ordinary constituents of the body, and, as he calls them, "the thermogenic magazines," analogous to fatty substance, and capable, possibly, of conversion into grape sugar and carbonic acid, or into the lactic acid of the gastric juice.

In the second paper by Virchow,* to which we have alluded, the author thinks he has made considerable advances on the subject. In all the cases in which he found the cellulose, chronic and extensive disease of the osseous system existed; and he thinks these diseases exercise a determinate influence on the production of the waxy "degeneration"—the disease, especially caries and necrosis, inducing a deficit of nutrition and cachexy, thus robbing the spleen, kidneys, &c., of their natural elements, and disposing them to take on the degeneration. He has never met with the amyloid substance in the bones, but has so done in the cartilage of the joints of an old person with senile arthritis.

TUMOURS, MORBID DEPOSITS, EXCRESCENCES, &c.

Fibroid in the Heart's Substance. By LUSCHKA.†—After alluding to the so-called chondroid of Albers,‡ and the description by Rokitansky, of irregular fibrous masses in the substance of the heart, the author gives a case of a boy, aged six, who died of croup and pleurisy, and in the walls of whose heart a fibroid mass was found. It was of the size of a hen's egg, of oval shape, and situated at the outer surface of the walls of the left ventricle. No change in the endocardium existed. The tumour was of the consistence of ordinary uterine fibroids, giving, when cut into, a gristly noise, of white colour and tendinous look. A manifest but irregular meshwork existed, supported by bundles of fibres; the meshes being elongated, angular, or rhomboidal. The substance within the meshes was of a dull-white appearance, and slight consistence; and the whole was more or less surrounded by a membrane, proving, to the author's mind, that it was a true fibrous tumour, and not the massing together and conversion of the remains of inflammation; and the investing membrane was specially visible exactly at the spot where the tumour on the outside was in close contact with the visceral pericardium. The structure of the connective-tissue membrane separating the deposit from the sub-serous cellular material, was of thickly felted threads and bundles, with very much elastic fibre, both in a complete and incomplete condition; and small bloodvessels were traceable through into the tumour. The microscopical examination of the interior showed homogeneous as well as fibrous streaks and bundles of connective tissue, and also numerous connective-tissue cells elongating into fibres, and in various stages of development. A few so-called elastic nucleus fibres were seen. The softish material enclosed within the meshes behaved like structureless intercellular substance, containing simple and occasionally net-like united cords, as seen in uterine fibroids; and on the addition of acetic acid, gave the appearance as of fine elastic, partly auricular, partly spirally-arranged fibres.

* Archiv, p. 364. July, 1855. † Ibid., p. 343. ‡ Atlas, iii. Tab. 10.

Progressive Papillary Excrescences of the Skin.—Dr. Stubenrauch, the author of an Inaugural Discourse at Giessen on this somewhat rare form of tumours, formerly known as Papillary Nævus, illustrates the subject by two preparations in the Giessen Museum. Before detailing the cases, he reviews the various forms of hypertrophied papillæ, amongst which warts, condylomata, and epithelioma, are found. Other hypertrophies of the papillæ, as ichthyosis, whose method of appearance is different, are to be classed in a different category. Though agreeing in elementary composition, these growths show, some an innocent, others a malignant character. For instance, epithelioma differs from warts and condylomata by its tendency to affect deeper parts than the mere skin, by its infection of lymphatic glands, its ready destruction, &c. The papillary nævus agrees with all these growths in its seat of origin; according with the warts and condylomata as to its innocency, but, owing to its segregation, &c., resembling to a great extent epithelioma, which, arising generally from warty processes, differs from warts, nevertheless, in their greater softness, sensibility, and greater amount of blood contents. The prominences become ragged, the epidermis splits, the chinks become covered with numerous epithelial cells, which are united by adhesive matters, and owing to the growth of new papillæ, cauliflower-like growths arise. The regenerative spaces in the papillæ and subcutaneous cell-tissue are characteristically present in epithelioma. To the above epithelioma the papillary excrescence has by far the greatest resemblance, but yet its whole course causes it to differ from it.

The author then describes the two cases which serve as part of his dissertation. The first was the upper extremity of a girl, aged eighteen, amputated half way down the arm. The patient had never menstruated, and always been sickly, and her arm began to be diseased when she was a year and a half old and suffering from strumous ophthalmia. The first thing observed was an outgrowth of papillary excrescence, at the upper part of the arm. In the course of the next twelve years the remaining part of the upper and fore-arm became involved, the excrescence advancing in a serpentine direction, the older parts affected getting well, whilst the new ones became worse. The hands and joints of the fingers became affected and greatly enlarged, and the parts of skin not involved being thickened and contracted, and the limb was then amputated. The excrescences had a varied appearance, being chiefly grouped in a cauliflower way: soft, red, covered by a thick epithelium, and resting on larger and smaller bases. In places they were polished, and often pressed together. The larger growths having a smaller base were enlarged at their upper surface, club-like, the smaller ones approximating to cones; and during life they were of a deep-red colour. They varied in size up to three-quarters of an inch, the transition from the greater to the smaller papillæ being very gradual. The epidermis, which was thickened, was easily removed, and penetrated not only between the single excrescences, but also between the secondary papillæ, which were formed by the splitting up of the single excrescences; and during life the recesses between the papillæ were of a yellow colour, filled with pus-like fetid material, containing abraded epithelium. On minute examination, the fibres of the corium, from which the excrescences arose, were seen to pass into them, but were not traceable into the secondary papillæ, which only showed a granular structure. The bloodvessels between the fibres at the base of the large excrescences divided in a fork-like way, and sent their twigs to each secondary papillæ, within which they formed loops; so that the whole excrescence, owing to the plentiful vascular supply to the secondary papillæ, and by the increased size of the capillaries, assumed the aspect of teleangiectasis. Very often two vessels in a secondary papillæ existed, forming numerous non-anastomosing convolutions. Nothing like abnormal tissue was found either in the papillæ or the neighbourhood; and it was remarkable that both the skin on which grew the hypertrophies, and that of the fore-arm from which they had retired, presented neither sudorifics, nor sebaceous or hair follicles. The areolar tissue was free from fat, and the corium thickened in many places to

the fourth or fifth lines, and both were infiltrated with serous fluid. The muscles and nerves, &c., in the neighbourhood, and lymphatic glands, were natural, as were the arteries; but the superficial veins were increased in size. The bones of the carpus and the phalanges were thinned and crumbling.

In the second case detailed, in which the leg of a man, aged fifty-one, had been amputated below the knee, the course was the same, but the papillæ were more hypertrophied and more closely grouped together.

The author considers the above to differ from condylomata in not being of syphilitic origin, and from epithelioma in not affecting lymphatic glands, and in sparing bones and fasciæ, and in not having globular epithelioma.

Dr. Wernher, of Giessen, also has a paper on "Progressive, not Cancer-like, Papillary Tumours of the Cutis."*

Atheroma, an Encysted Epithelioma.—Dr. Wernher, of Giessen, has a paper with this title.† He alludes to the views of Kölliker and others, that atheroma was the result of closed, largely-developed, sebaceous follicles; and of others, like Paget, who rank them amongst the dermatoid tumours, and consider that some may be only closed hair follicles, as Astley Cooper had described them to be; and of Bruno, who places them between sero-cystic and dermo-cystic tumours. The latter considers them, like Paget, to arise in two various ways—partly out of sebaceous glands of the skin whose mouths have been closed, and whose secretion has so accumulated; and partly as quite new formations; but yet specially attributes their origin to the cuticular sebaceous follicles. Wernher says there are tumours situated in the skin—the cysted tumours of Cooper—having their sebaceous contents pressed out through an outlet, but other tumours are wanting in any open or stopped-up outlet. These latter are considered originally to have had such an outlet, which has become closed, or to have arisen as an imitation of the sebaceous glands in the neighbourhood of the cutis, with which they never were connected by means of an outlet. No one knows how the closure takes place, as the tumours exist in parts which have neither been wounded, ulcerated, nor inflamed. Bärensprung alone met with them under cicatrices, and imagined that the duct of the glands had been wounded; but the author seemed to think that the testimony in proof of the obliteration is too scanty. He quotes an instance from Lebert and Bruno, in which an obliterated duct had been dissected out. Smaller atheromata, for the most part, are not hollow or fluctuating, and it is only as they grow that, by the solution of their contents, they become hollow spaces, or cysted tumours. Many are found where no hair follicles or sebaceous glands exist; and Schuh found them between and under the muscular layer of the temple, under the mucous membrane of the tongue, in bone, in the pia mater, &c. Wernher then relates ten cases, which we must pass over.

After the relation of the cases, the author proceeds to say that he considers atheromata to be simply pathological imitations of closed sebaceous glands; and this he concludes, not merely from the fact that they may exist in places where no hair or sebaceous glands are found, nor from the fact of any difference in their contents, but rather from the fact that they have quite a different structure and method of development from those glands. The atheromata seem never to consist of a simple sac, with a fibrous tunic covered by epithelium on the inner surface (the so-called cystic tumours of Cooper are excluded); they all showed either a much more complicated structure, or the remains of an earlier, more complicated arrangement in numerous transitions. At first they are solid and hard. The fibrous tunic forms nucleated epithelial cells, constantly produced in new layers, and gradually pushed towards the centre. At the same time they lose their nuclei, become flattened, shrivelled, and often filled with calcareous granules. Often the centre is so calcified as to resemble a white friable nucleus. The calcified central layers finally soften down into at first a crumbly, and then a fluid

* Henle and Pfeuffer's Zeitschrift, Band vi. Heft ii. p. 109. 1855.
† Virchow's Archiv, p. 221.

pultaceous mass. In the compound atheromata the epithelial spheres entering into the formation of horny layers also incline towards the fluid centres, and either more and more diffuse themselves so as to be indiscernible, or remain in such a state that they float in the pultaceous parts. No trace whatever of any excretory duct is to be found, although the smaller atheromata are always to be found immediately beneath the cutis. Even where a fibrous chord of connexion does exist between them and the cutis, it is not necessarily an obliterated duct. In some cases, it may be from expansion of the tumour, the skin and the surface of the sac inflame, unite, and an opening is formed simulating an excretory duct. A number of granules, or large, sharply defined, yellow small masses, appear in a structureless ground, become surrounded with laminæ, grow into epithelial globules, just as happens in epithelioma; the basement membrane in which the commencing globules are imbedded being covered by delicate pavement epithelium when not covered by a thicker horny layer. The single epithelial globules grow into larger epithelial spheres, and become surrounded by a fine tunic, bedecked with a pavement epithelium. The spheres may become calcified, just like the horny layers of the main sac. The epithelial globules are also to be found along with the large epithelial spheres, lying thickly together in every stage of development. Sometimes they unite to form thin plate-like masses, the older ones being towards the inner side. At first, the globules and spheres are separated from the fluid contents by a fibrous layer, which they burst, and oftentimes those whose covering has been destroyed are seen mixed with those as yet encysted. In most cases the horny plate is commenced by the coalition of numberless epithelial globules and spheres, which may be seen by the microscope on the outer surface of the layer, as small granules jutting out, often of very large size and number.

Sometimes the single concentric globules are separated by long spaces, in which the concentric arrangement of the cells into single globules cannot be seen. It would appear as if the formation of the epithelial spheres in the wall of the main cyst could proceed almost perpetually. Where the epithelial spheres lie in great numbers, the remaining parts of the capsule form very thick irregular fibrous layers, penetrated by calcareous crystals. The development of the primary sac, like that of the secondary spheres and cavities, results from an epithelial globule, which forms its own fibrous investment; but our author does not even venture to guess at the origin of the primary globule.

As regards the similarity between the compound atheromata and epitheliomata, the author says in both cases we have growths of epithelial formation, as well in the structure of the skin as in non-cuticular places—in both cases there is an uncertain growth and successive after-development, if once the germ be sown—in both cases the disposition of the formative material to form aggregations and laminated spheres exist, out of which arise the characteristic "globules epitheliales." In both cases, also, the disintegration of the epithelial formations forms a white pultaceous mass, consisting chiefly of thickened shrivelled epithelial cells, cholesterine plates, and amorphous clumps of lime and albumen, which in the one case fills the apertures and interspaces of the cauliflower-like growth, and in the other the cavity of the holes of the sac, serving as a common investment. The most important anatomical difference consists in the fact that the so-called atheromata are enclosed in a firm sac, in whose cavity it develops itself, which is wanting in epithelioma, whose growth in the surrounding areolar tissue is not hindered by any such limits; that furthermore the epithelioma, inasmuch as it is developed on the surface of the skin, is wont to be united with the growth of the dermoid tissues above, specially the papillæ.* These anatomical differences are, nevertheless, so unessential that they serve as characters of varieties, but do not exclude the near relationship of forms.

One allows that cysted and non-cysted scirrhus, if only their characters otherwise agree, are identical diseases. Wernher hesitated not, therefore, to describe the so-called atheroma as encysted epithelioma, and to rank it among the epithelial cancers.

On Pearly Tumours (Cholesteatomata of Müller) and Cancroid. By R. Virchow.*—Virchow considers cholesteatomata to be, like hair and fat cysts, new formations, and very strictly to be separated from atheromata or tegumentary tumours, which arise from pre-existing tegumentary formations. They are newly-formed cystoids. He speaks to cancroids as being nearly related to cholesteatomata, which are tumours of an alveolar structure, in which the walls of the alveoli are formed of cells, the pseudo-cancer of Lebert, and so differing from the true cancer, wherein they are of areolar tissue; the alveoli in both cases containing cells or nuclei with fluid intercellular material. He also alludes to fibroids which have a kind of alveolar structure with fibrous contents. In opposition to Bennett, who considers all tumours whatever, which have a cancerous look, but not a cancerous structure, such as enchondroma, to be cancroid, and to others who consider cancer of the lip to be only a papillary and epidermal growth of the surface, Virchow regards cancroid as consisting in the formation of cavities or alveoli, in the interior of diseased tissue and organs, which become filled with epidermis-like cells. These cavities are large and to be distinguished from the alveoli of true cancer microscopically by their arising within old structural elements, without that newly-formed layer of areolar tissue which constitutes the wall of the alveolar cancer. If one imagines large round spaces filled with nucleated and non-nucleated cells disposed concentrically, and their interior to pass into a granular pultaceous state, he would then have the pearl-like structure of cholesteatoma.

Virchow considers the history of pearly tumours to be made clear, specially the similarity of development between them and atheromata and cancroid (epithelioma), the young cholesteatomata pearls at a certain stage not differing from simple atheroma pearls and cancroid pearls, all of which are globular lamellar structures of flat epidermal cells (*globes epidermiques*), and the ordinary pearls of atheroma deviate only from those of cholesteatoma and cancroid in not containing inside such peculiar glistering, spherical, and oval structures in general. Laminated epidermal spheres can no longer, then, be considered a special or specific property of cancroid, the more as they all occur in places in which epidermis is formed in growing masses, equally whether it pre-exists, as in the outer skin, or whether it is found independently, as in thymus and mammary glands, testicle or fistulous ulcers, or cerebral membranes, &c. This is proved by those cases in which globular laminated accumulations arise from relatively such disturbances as is the case in skin warts, in which the deep depressions of the superficial integuments between the papillæ gradually produce in themselves epidermal globules. This generally occurs about the nails, but also in hair sacs, with their dilatation; especially in lupus does one find structures of this kind in the hair sacs. There seems to be three groups of epidermal structures. 1st, The ordinary epidermis, with its projections into hair sacs and glands of skin, as also the transitions of true canals and mucous membranes. 2nd, Those formed by the transformation of gland cells, as in testicle, thymus, mammary glands, &c. 3rd, Those formed out of areolar tissue, as in cancroid, cholesteatoma, &c.

Cholesteatoma belongs, consequently, to the class of complete heterologous formations, because it arises in places which normally neither contain epidermis nor epidermis-like elements. Virchow suggests the name pearly tumour as being preferable.

In a thesis for the doctorate at Paris, J. N. Dupuy treats at length on 'Cancroid or Epithelial Cancer.' The subject is discussed in a general point of view; and the author, after giving in full detail four cases, draws the following conclusions:

1st. Cancroid is an affection which may affect all the parts of the organism, primarily or secondarily.

2nd. It may produce and propagate itself not only in the tissues or ganglia directly in communication with the anatomical region of the original seat, but it may also generalize itself, invade the whole economy, and bring on cachexy, infection, just like true cancer.

* Archiv für Path. Anat. und Phys., p. 371. Oct. 1855.

3rd. Being an affection which only presents hæmœomorphous products, and having in all points a progress analogous to that of cancer, there is no need of specific heterologous capsules to constitute this malady.

On Multilocular Ulcerating Echinococcus Tumours of the Liver. By RUDOLPH VIRCHOW.*—After alluding to two cases of alveolar colloid, described by Buhl, one in the 'Munich Illustrated Gazette,' 1852, and another in the 'Zeitschrift für Rat. Med.' 1854, Virchow mentions a third described by Ernst Zeller, in an inaugural treatise at Tubingen, 1854; but in none of these was the history of their development capable of being made out further than that Buhl imagined their earliest development to be from solid or cystic grains, which might be compared to nuclei or elementary corpuscles, and the later growth to result from intussusception or exogenous surrounding deposition. In the case related by Sommer, there existed in the interior of the tumour, as in the other instances, hollow spaces, but also a great number of the colloid cysts, young manifest echinococci; and Zeller thought he could thereby establish the difference between the alveolar colloid and the special colloid cancer of the liver, and that the formation of the hollow spaces was due to the suppuration of the echinococcus cysts. Virchow then reviews numerous cases on record by Meyer, Dittrich, and Forster, which are possibly of the same nature, but limits himself to the three undoubted cases before mentioned, of Buhl and Zeller, and adds a fourth one himself. He substantiates the descriptions of the others, but entirely differs from them in their interpretation of their observations. Forster had already mentioned the resemblance between the echinococcus membrane and certain colloid formations. The subject of Virchow's case was a man, aged thirty-eight, who was treated for abdominal pain, diarrhœa, and jaundice. The patient died with voiding of blood by stool and collapse. On examination after death, the liver was found to be enlarged, having a thick cartilage-like plate on its surface, which, on section, proved to be from eight to ten millimètres thick, and covering a cavity the size of a fist, situated in a growth equal to a child's head in size, out of which a dirty yellow pus-like fluid escaped, which on standing was converted into greenish-yellow turbid serum, and a yellowish white sediment containing much granular material, partly fatty and partly consisting of cell forms, with here and there granular corpuscles. The inner surface of the large cavity was entirely covered by irregular projections, whilst in the neighbourhood of the upper surface mere secondary cavities existed, whose walls, soft and covered by a whitish, delicate, and somewhat flocculent investment, indicated their later formation. These small cavities were separated from the larger ones by the large partly dissolved and partly firm mass of the tumour. These last, on their under and inner part, showed a deeply yellow compound border, otherwise in every direction clear, globular, or cyst-like bodies, mostly of the size of hemp seeds, existed in a dirty greenish white matrix, in every direction. The wall itself of the tumour, which in various places possessed a very variable thickness, was for the most part of like composition. Externally came first a hard tendinous layer of connective tissue, and then more internally a number of gelatinous cysts, laying in cavities of the size of millet seeds, and smaller. Towards the under side, where were the neighbouring cavities, the layer of connective tissue was hardly a millimètre in thickness, and the presence of small gelatinous cysts, only to be recognised on the inner surface of the sac by the presence of many shallow pits. The mass of the tumour was composed of a fine alveolar tissue, whose stroma was white, very firm, and dense; whilst most of the alveoli appeared as small puncta. Here and there larger and more substantial cavities existed, corresponding to dilated gall-ducts, but containing no cystic or gelatinous masses. In the small alveoli, on the contrary, isolated yellow gelatinous lumps, lying quite loose, existed. On closer examination, a section through the tumour showed a thick fibrous stroma, exhibiting the ordinary properties of areolar tissue, beset with numerous spindle-shaped and

* Verhandl. der Phys.-Med. Gesellsch. Würzburg, Band vi. Heft i. p. 84. 1855.

reticulated cells. In many places—viz., towards the large cavities, this tissue was undergoing fatty change; in other places, masses of yellow and brown pigment existed. More to the outside, masses of parenchyma of liver cells infiltrated with gall pigment penetrated between the fibrous material. In the middle of the connective tissue, in, sharply defined, partly rounded, partly elongated and bulging out, or contracted cavities, lay the gelatinous masses, corresponding in the majority of cases to the descriptions of Buhl and Zeller. The smaller of the cavities had a diameter of 0·03 to 0·16 millimètres; the largest, 0·3 to 0·4 millimètres in general; but towards the centre of the liver they were as large as three millimètres in breadth. The gelatinous masses in the smaller cavities consisted of a laminated glittering structureless wall, and a cavity filled mostly with somewhat granular and chiefly fat-holding materials. On the inner side the wall was very much folded, and the contents often disposed in masses; but oftentimes lateral outbulgings in the wall existed. Where the largest cavities existed, their distance from each other was much diminished—in some cases there was no intervening tissue. Out of the larger cavities large connected gelatinous masses could easily be withdrawn, which when placed in water quickly extended into large pellicles, out of which escaped cysts of the size of millet or hemp seeds, always very wrinkled. Here and there appeared to have occurred not only a clustering of more cysts in the same hollow space, but also an encasing of cysts one within the other. The cysts on their outer surface were mostly completely smooth, and only slightly sprinkled with amorphous, and here and there granular and coloured particles. Inside, on the contrary, an opaque material existed, which in most cases appeared simply granular, but often showed almost cell-like divisions. The larger pellicles exhibited the same changes as one generally finds in echinococcus membrane. In the place of the fine stripes, granular fat-like glittering particles existed in necklace-like rows, or in single and compound groups. But on the inner surface existed quite a new and peculiar arrangement. Here lay a star-shaped structure, anastomosing and net-like, which was thickened at the knotted joints. In places, this net-work tissue was larger, and its projections and threads of union broader and tube-like; and its larger parts more obvious, owing to granular deposit. Thus there arose the greatest similarity to lymphatic vessels in a state of development. Inside the pellicles existed an elongated or rounded sac or capsule, formed of a delicate membrane, containing large glittering bodies. The capsule differed from ordinary echinococcus cysts in being of simpler formation, the thickest not showing more than two layers. Yellow and yellowish brown pigment and hæmatoid crystals were accumulated also within them. Another kind of formation also existed, of a yellowish colour and cloudy appearance, elevated from the surface of the tunic, and looking like small clavate appendages of the same; many of them were almost homogeneous, and furnished at the free end with parallel curved lines, just as if in this place a growth in layers had occurred. Most of them contained under this laminated clavate extremity a small egg-shaped hollow, so that one was reminded of numerous entozoa ovaries. Around the tunics, and between them, lay very many concentric bodies, generally aggregated into larger groups, and consisting of calcareous salts and an organic base. They were discriminated from the well-known calcareous granules of echinococci by their size. In the fluid of the caverns also existed numerous needle-shaped truly fatty crystals, with a sheaf-like arrangement. The author discovered young echinococcus animals after some search, but only in the portal part of the tumour, where the great alveoli were, and which was probably most recently formed. They were invisible to the naked eye, and some possessed hooklets, whilst others were destitute of them. After this, he says we cannot doubt that the whole was composed of small echinococcus cysts, and should not be named alveolar colloid. Schröder van der Kolk, from his injections, imagines that the echinococci of the liver are situated in the gall-ducts. In none of the above instances was this the case; the ducts and vessels were all free, and it seemed as if the lymphatic vessels were the seat of the ani-

malcules, as they followed the portal tissue mainly, and accumulated in places, as if placed in a tubular system. The author proposes the question, whether the hooklets disappear after a length of time, or whether it be that some animalcules in their early stage have no hooklets.

Collonema in the Brain.—An instance thereof is related by Wagner, of Leipzig.* No history is given of the case. The tumour was equal to a walnut in size, and was removed from the brain of a middle-aged person who died of puerperal fever. It was covered by a thin investment, excepting where its attachment had existed, and was so soft that when moved it trembled like a hydatid. It contained no vessels or any trabecular work, and its general colour was that of clear horn, whilst at its periphery it had places of the size of a pea, of a white or whitish-yellow hue. The investing membrane chiefly consisted of fine, partly streaked, partly irregularly wavy areolar fibres, closely matted together; but here and there intervened tolerably strong areolar bundles, terminating in fine fibrils with an undulatory course. Some fibres, called by Rokitansky "tubular fibres," also existed of a tolerable thickness, somewhat resembling capillaries, but on the addition of acetic acid showing a simple contour, clear walls, and contents at one time thickly, at another sparingly, granulated. In many places also between the first-mentioned fibrous network a very thick network of fine elastic fibres existed, such as is found in many serous membranes, and knot-like swellings existed where the fibres anastamosed. Some corpora amylacea were found along with brain débris on the outer surface of the investing membrane. The tumour itself showed, for the most part, a soft, slimy, amorphous, and very finely-granulated irregularly-striped or cloud-like mass, which only gradually mixed with water, and by addition of acetic acid assumed the form of thick threads and chords, or clumpy masses, becoming fluid on addition of potash water. Numerous structures, like areolar tissue corpuscles, were seen. There were at one place spindle-shaped and narrow corpuscles, passing gradually into fibres; at another place, globular, roundish-oval or irregularly angular. Their contents were variously granulated, exhibiting fine, glistering, darkly-contoured puncta. Some had a clear round nucleus, with or without nucleoli, but most were destitute of nuclei. The processes of the areolar tissue corpuscles were chiefly from two to four in number, and some had from one to two secondary processes from their extremities, and were of various breadths, diminishing towards their extremities. Some of the processes had club-shaped projections on them of various thicknesses. The processes chiefly had clear contents, with occasional dark molecular particles, and by the processes at times the corpuscles anastomosed. Bodies like areolar tissue corpuscles without any processes were also seen. Besides the above, bodies also were seen of $\frac{1}{400}$th to $\frac{1}{200}$th of a line in diameter, round, and with fine refracting contents, many of them containing bright spots, and having the same chemical re-agency as the areolar tissue corpuscles. Numerous sharply-contoured glittering colloid corpuscles, varying in size up to $\frac{1}{80}$th of a line, and very soft, were visible.

All the above microscopical elements were seen in the yellow as well as the white parts, but the two last-named elements were more abundant in the white parts. No stroma, no vessels, and no epithelium lining the surface of the investment, were to be discovered.

The author likens the tumour to two described by Müller, one by Schuh, and some by Rokitansky, at least to a certain extent. He considers the tumour as of non-malignant character.

A Case of Osteoma of the Left Femur is related by Virchow,† in which fibrous masses existed, consisting of round coarse fibres, resembling completely developed muscular fibres of the pregnant uterus, interlacing in the manner of uterine fibroids. Concentric lamination also of membranous material, round fibrous bundles, also existed. The tumour was not otherwise remarkable.

* Virchow's Archiv, p. 532. Oct. 1855. † Ibid., p. 524.

A Tumour of peculiar character, affecting the Cancellated Bony Structure of the Foot, is described by Dr. Ballingall.* Several similar cases had come under his notice at the Jamsetjee Jejeebhoy Hospital; and though the kind of tumour had been before described, its microscopical characters had never been detailed. The foot becomes enlarged to three or four times its natural size, and at first sight one is reminded of elephantiasis, but the affection does not proceed beyond the ankle. Tubercles exist on the surface like large granulations, many giving forth purulent fluid through openings which are connected with sinuses passing to the centre of the foot. The bony tissue is found almost entirely removed, and the articulation quite destroyed. The bones of the tarsus and metatarsus are replaced by a strong areolar tissue, having spaces in it varying in size up to that of a pea, and filled with granular materials. The pulpy substance is found by the microscope to consist of cells of large size, the walls of which in some cases seem to consist of several layers. They are for the most part circular and oval, and surrounding the walls are transparent fungus of long spicula. Numerous oil globules are also seen. The medullary canal of the tibia is also generally enlarged, and the bone reduced almost to a shell; but no abnormal microscopical appearances are to be detected of these parts. On treating the above-named cells with æther no effect is produced, but the spicula are dissolved by liquor potassæ: the cell remains intact. Dr. Ballingall thinks that the disease is of parasitic origin, and confined to the region of Guzerat. Very little pain attends the course of the disease, and the stumps of legs amputated in consequence of it, healed well. None of the patients operated on were known to return.

Of the following interesting papers we can only give the titles and references: On the New Formation of Striped Muscle in the Testicle.† The Developmental History and Surgical Importance of Cysts of the Testis. By Billroth.‡ The Nature of Colloid-Cystoids. By Dr. Beck.§ On Cavernous Tumours. By Maier, of Friburg.‖ Trichina Spiralis. By Henle.¶ Microscopical Examination of the Atmosphere. By M. A. Baudremont.**

QUARTERLY REPORT ON PATHOLOGY AND MEDICINE.

By Edward H. Sieveking, M.D.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, ETC. ETC.

I. *Observations and Remarks on Diseases of the Brain.* By H. Bamberger. (Verhandlungen der Physicalisch-Medicinischen Gesellschaft in Würzburg. Band vi. Heft 2, p. 283.)

Although we are not informed with regard to the number of the cases upon which Dr. Bamberger's remarks are founded, it is manifest that his experience is extensive, and his opinions therefore carry considerable weight. The cases which he does record are of much interest, and embrace almost the whole field of cerebral pathology. The following are the prominent points of his investigations to which we would draw the reader's attention.

Apoplexia Nervosa.—Pathological anatomy has so much narrowed the limits within which it is possible to apply the term nervous apoplexy, that we now rarely meet with cases to which it may be fairly given—viz., those in which sudden death occurs with cerebral symptoms, and in which no palpable lesion is discoverable after death. It is probable that the microscope and pathological chemistry may reveal minute changes that have hitherto escaped detection, and that the term, in its present sense, may have to be entirely eliminated from nosology. Dr. Bam-

* Transactions of the Medical and Physical Society of Bombay, p. 273. 1853–4.
† Virchow's Archiv. April, 1855. ‡ Ibid., p. 268. July, 1855.
§ Illustrirte Medizinische Zeitung, Heft 5. ‖ Virchow's Archiv. April, 1855.
¶ Henle's Zeitschrift, p. 247. ** L'Union Médicale. Oct. 20, 1855.

berger is of opinion that sudden death resulting from violent emotions, electricity, and concussion, must be classed in this category. He quotes one case that fell under his observation. A girl, aged twenty, previously in perfect health, was admitted into the Prague Hospital in January, 1850, having the evening before been seized with vomiting, followed by universal convulsions and unconsciousness, brought on by the information received in the morning of the same day that her lover had proved faithless. The temperature of the surface was elevated, the pupils unaltered, the eyes closed, the face pale, respiration stertorous, and the pulse intermittent. There was occasional spasm of the extensors of the upper and lower extremities, and also of the abdominal muscles. The extremities, when raised and allowed to fall, descended as if lifeless, though not actually paralytic. There was no return of consciousness, and she died twenty-eight hours after the seizure.

Necropsy. The brain was pale and anæmic, the walls of the left ventricle of the heart were slightly hypertrophied, the aorta very narrow and its coats thin, the heart and large vessels were full of loose coagula. All other organs were perfectly healthy. There was no suspicion nor any evidence of poisoning.

Apoplexia Serosa.—We are still on debateable ground; for although the occurrence of sudden death, with symptoms of apoplexy, and exhibiting serous effusion into the ventricles, the substance of the brain, or the meninges, is undoubted, the majority of observers (as Abercrombie, Dietl, Wunderlich, Leubuscher) are of opinion that these cases are rarely, if ever, idiopathic. Dr. Bamberger has frequently met with the varieties of acute serous effusion alluded to, but is of opinion that they are always the secondary result either of other cerebral diseases and abnormal states of the cerebral circulation, or of an altered state of the blood induced by some other acute or chronic disease, as granular kidney, typhus, acute exanthemata, tubercular, cardiac, and other maladies.

Meningitis.—Dr. Bamberger adverts briefly to a few points connected with this subject, one of which is the occurrence of inflammation limited to the ventricular lining membrane; he is of opinion that where the post-mortem appearances indicate such a condition, a previous inflammatory exudation on the surface has been reabsorbed, or overlooked as an unessential concomitant.

Cerebral Hæmorrhage.—The author refers all cases of hæmorrhage to increased pressure in the vascular system, or to an altered condition of the coats of the vessels. He denies that passive hæmorrhage accompanying dyscrasic states, results directly from the altered condition of the blood, but from the alterations previously induced in the coats of the vessels. He admits that the latter lesion has not yet been demonstrated. As but few authentic cases of passive hæmorrhage within the cranium are on record, he relates some that have fallen under his own observation in typhus (typhus petechialis), scurvy, and chlorosis. The rarity of the occurrence in typhus is shown by the fact that Dr. Bamberger has only met with it once in above a thousand cases of the disease. In that case, after death, which had ensued on the thirteenth day of the typhus, in a boy, aged fifteen, a cavity of the size of an egg, containing blood that was slightly coagulated, was found in the right corpus striatum. This was also the site of the apoplectic spot found in a girl, aged twenty-five, who died suddenly while under treatment for intense chlorosis. In scurvy, which the author has repeatedly found almost epidemic, he has also met with apoplexy in a girl, aged twenty three, in whom numerous small apoplectic spots were found closely aggregated in the right anterior cerebral lobe, besides another large extravasation on the convexity of the left posterior lobe.

We must pass over the author's observations on the uniform occurrence of the crucial paralysis shown with reference to the facial, fifth, oculomotor, optic, and acoustic nerves; on the rapid return of sensibility, compared with that of motility, in the paralysed half of the body; on hæmorrhage into the pons, the sac of the arachnoid, into the tissue of the pia mater, and the grey matter of the brain.

Red softening occurs in three forms; it may be latent and accompanied with

such trifling symptoms as not to induce a suspicion of a cerebral affection; it may be accompanied by symptoms of apoplexy; or it may manifest a very chronic form, in which we meet with the most varied symptoms of cerebral irritation and compression. It is only in the last variety that a diagnosis is possible, though even here there are numerous sources of error. A very peculiar case is detailed, in which the author assumes the conversion of the ordinary products of normal inflammation into tubercle—a view which is certainly at variance with the prevailing opinions on tubercle and the tubercular diathesis. The case is briefly this. A female, aged thirty-five, was seized in the fifth month of her seventh pregnancy with pneumonia, which lasted three weeks; about three weeks later severe headache was followed by sudden rigidity of the left extremities, the fore-arm and leg being flexed; severe convulsive movements of the same extremities ensued, lasting a few minutes. There was no unconsciousness, though she was slightly giddy during the attacks. The rigidity and the temporary spasms continued for a week, when she was admitted into the hospital (November, 1851). She was able to answer questions, but her memory was somewhat impaired. There was occipital headache, paralysis of the left side of the face, violent contraction of the right trapezius, of the left arm and leg; attempts to overcome the flexion caused severe pain. Sensibility of the parts unimpaired, total loss of motility; some improvement took place in the paralytic condition, but in December an epileptic seizure supervened; delivery followed in the same month; further epileptic attacks ensued, with pleurisy in the right side, and advancing tubercular disease of the lungs. Death on the 27th January. The state of the brain was as follows:—On the inner and upper surface of the right hemisphere, a portion of the size of a desert plate exhibited intimate adhesion between the membranes to the brain by means of a greyish-red cellular tissue, and a yellow cheesy friable mass; the subjacent gyri were converted into a similar substance to an extent of 9 to 10 lines, not circumscribed as cerebral tubercle generally is; the cerebral tissue in the immediate vicinity was reddened and softened, the more distant portions almost pulpy. Old and recent tubercles were found in the apices of both lungs; the liver and spleen also showed tubercular deposit. Dr. Bamberger argues that the symptoms showed that the cerebral disease commenced with inflammation, and that therefore the deposit in the brain was the result of a conversion of plastic exudation into tubercle; but it necessarily suggests itself that the tubercular deposit may have been long dormant in the brain, and that the inflammation was a secondary affection. Until such cases are multiplied, it appears illogical to adopt a theory which is opposed to the common experience of pathologists. Two interesting cases are given of encephalitis, resulting from plugging of the arteries by fibrine carried from other portions of the circulating apparatus.

With regard to cerebral abscesses, Dr. Bamberger only confirms the known fact of their remarkable latency. The details of three cases are introduced in evidence.

Paralysis Agitans.—In one necropsy of a female, aged forty-five, who had been subject to constant tremors of both upper extremities and the head from her childhood, the meninges were found opaque, and infiltrated with serum, of which two ounces were found in the ventricles; the brain was otherwise normal. The characteristic feature was found in the spinal cord, which was white and moist, and exhibited throughout the white matter numerous grey, gelatinous spots; from the middle of the cervical to the middle of the dorsal portion there was a central canal, admitting of the passage of a probe. Dr. Bamberger regards the gelatinous spots as the residue of previous inflammation, and the formation of the canal as the result of atrophy of the cord.

Encephalic Tumours.—The diagnosis of encephalic tumours still remains, to a great extent, a matter of guesswork, the symptoms being mainly those of compression, which they share equally with other affections. Of 17 cases observed by Dr. Bamberger, 11 occurred in men, 6 in females—a ratio established by Lebert and Friedrich. They were distributed over the different periods of life

as follows:—Under ten years, 1; ten to twenty, 3; twenty to thirty, 4; thirty to forty, 4; forty to fifty, 2; fifty to sixty, 2; sixty to seventy, 1. Six were large tubercular or tuberculoid masses; 2, cancerous; 2, fibrous tumours; 2, simple cysts (not apoplectic); 1, echinococcus; 1, extended hard masses, of an undefined character; 2, osseous tumours in the cerebral tissue; and 1, cholesteatoma. In 10 cases the cerebrum, in 5 the cerebellum, and in 2 both, were affected.

The most uniform symptom was cephalalgia: this was absent only in 2 cases; it was severe and paroxysmal in 6. Paralytic affections occurred next in order of frequency—viz., 10 times; in 5 gradually, in 5 suddenly. Convulsive attacks were met with 8 times: 7 in the form of epilepsy (6 of these with cerebral, 1 with cerebellar, tumours); 1 in the form of convulsive affections of one side of the face. Derangement of the intellectual functions occurred in 8 cases.

The details of 3 cases of encephalic tumours, for which, however, we cannot make room, conclude Dr. Bamberger's interesting communication.

II. *Remarks on the Disease termed Insolatio, or Heat Apoplexy; with Observations on its Pathology.* By Marcus G. Hill, Officiating Assistant Garrison Surgeon, Fort William. (The Indian Annals of Medical Science, Oct. 1855, p. 188.)

We can scarcely do justice to the elaborate paper of Mr. Hill in the brief space that we have at our disposal; to those who take an interest in the subject, we would recommend it as a comprehensive survey and an intelligent analysis of the facts at our disposal. While he eloquently describes the widely-prevailing effects of the intense heat of an Indian sun, he denies that the heat alone causes the disease in question. A *tertium quid* is superadded in the form of intemperance, or some previously debilitating cause. Opinions of numerous well-known writers are quoted—Dr. Mouat, Dr. Johnson, Mr. Martin, and others—in support of the view of the author, that there is so close an analogy between remittent fever and head apoplexy as to amount to an identity. The difference between the two he regards as consisting mainly in the greater concentration of the poison, and the fatality of the event; he describes insolatio as an exaggerated attack of remittent fever, which few individuals possess the vigour of constitution to struggle through. A table of cases collected by Mr. Hill shows at a glance the fearful mortality of insolatio. Of 504 seizures there were no less than 259 deaths; of the remaining number 8 were doubtful, so that the per-centage of deaths to seizures was as 51·38, and of recoveries to seizures, as 45·03. Formerly, the disease was regarded as a primary inflammation of the brain; the more careful study of the post-mortem conditions shows that we have not to deal with any inflammation at all, and that the brain is only secondarily involved. The most uniform lesion met with after death is intense congestion of the lungs, amounting at times to an apoplectic condition; the organs being, as Dr. Mortimer describes them in his cases, "almost black, and to all appearances completely obstructed;" whereas the utmost trace of disease found in the brain is congestion of the superficial vessels, with some serous effusion under the arachnoid.

"But not only," says Mr. Hill, "do the after-death appearances favour the idea of the lungs primarily suffering, but the premonitory symptoms, though often referred to the head, are nevertheless as frequently concomitant with disagreeable sensations about the chest; and however we may feel inclined to dispute the point, there exists an extraordinary analogy between these cases of heat apoplexy and poisoning by carbonic acid gas, whether we look to the mode of accession, the sensations of the patient, the symptoms, the phenomena of the disease, the manner of death, the remarkable retention of the heat long after death, or to the post-mortem appearances. Likewise, the treatment so successful in these attacks, is the same which is found necessary in cases of poisoning by carbonic acid."

This theory is still further developed, and the views of different authors—Macculloch, Holland, Alison—are quoted in support of the analogy of malarious poisoning, with a circulation through the whole system of an over-carbonized blood. Knowing how much often depends upon the *name* given to a disease, and how much doubt and theory influence the selection in a given case, we fully sympathize with the following observations of Mr. Hill, to be found in the concluding remarks of his important paper:

"The facts on my side would have been much stronger had a more accurate system of nosology been adopted in classing this disease, for there can be no doubt that many cases of heat apoplexy have been arranged either as remittent fever or as apoplexy. When death has been rapid, then perhaps the latter name has been selected; whilst on the other hand, when the first symptoms have abated, and death does not occur for some time, or at all, then the former designation would appear to be preferred."

III. *Communications on Diseases of the Cerebral Nerves.* By Dr. Ludwig Turck. (Zeitschrift der k. k. Gesellschaft der Aerzte zu Wien, 11th Jahrg., Monatheft ix. and x. p. 517.)

The first case given by Dr. Türck is one of compression of the right olfactory nerve against the bone, by means of cerebral cancer, producing, about four weeks before the death of the individual (a man of thirty-two years), entire anosmia. The nerve itself exhibited numerous glomeruli, but no diminution in the number of nerve-tubes.

A series of cases, in which the optic nerves were involved in diseased conditions, follow. Dr. Türck has met with eleven instances of compression of the chiasma, resulting from chronic enlargement of the brain, induced by cancerous or tubercular disease. In all these cases, a consecutive degeneration of the entire optic nerve had followed, to which amblyopia, or complete amaurosis, with sluggishness of the pupil of the corresponding side, were attributable. In two cases, the part immediately behind the chiasma was pressed downwards by morbid growth upon that section of the circle of Willis from which the posterior communicating branch arises from the internal carotid, so that the anterior part of the optic tract was constricted by the internal carotid and the posterior communicating artery.

Tubercular meningitis in three cases produced pathological changes in the nerves at the base of the brain. In one, the third pair were flattened against the posterior clinoid processes, and the arachnoid of the base was opaque and granular. The nerves, examined by a lens, were found to be uniformly reddened, and their bloodvessels much congested; under the microscope, they exhibited between the intact nerve-tubes a fine molecular mass. Similar changes were observed in the sixth pair, so far as they are in contact with the arachnoid. The right nerve was, in each instance, more affected than the left. During life there had, for six days before death, been complete paralysis of the third pair, with paralysis of left abducens, that of the right being doubtful. In the second case of tubercular meningitis, there had been intense paralysis of the left motor-oculi nerve for nine days before death, and the nerve was found distinctly reddened and injected to the distance of three or four lines beyond its exit from the arachnoid, all the other nerves being entirely pale. In the third case, where paralysis of the left oculo-motor had supervened during the last days of life, the nerve was found visibly injected, and presented in its interior a few small spots of capillary extravasation. In the last two cases, the nerve-tubules were unaltered; nor was any molecular deposit observed.

Several cases are detailed in which cerebral nerves were found degenerated. In a female, aged twenty-seven, who died of carcinoma of the brain and spinal cord, and who had exhibited divergent strabismus, with immovable pupils, the oculo-motores presented a lardaceous appearance, and almost cartilaginous hardness; the tubular structure had almost entirely disappeared. In a female, aged thirty-eight, who died hemiplegic, and had exhibited complete paralysis of the

right oculo-motor nerve, the nerve was found reddish-grey, irregularly thickened, and after its entrance into the orbit, uniformly thickened and harder, opaque, and greyish-yellow.

Well-marked atrophy of the right abducens was noticed in a girl of sixteen, who, from her second year, had been affected with convergent strabismus, following an attack of meningitis. A similar condition was observed in a man who, after a temporary paralysis of the right rectus externus, died of hemiplegia. Atrophy of the two accessory and hypoglossal nerves was found in a female, aged forty, who, for a year before her death, had been affected with gradually increasing universal paralysis. The nerves were reduced in size, of a reddish hue, and presented fatty degeneration of some of their tubes.

Similar conditions were observed in other cases of disease of the osseous textures at the base of the brain, involving secondarily the optic, ophthalmic, abducens, facial, hypoglossal, and accessory nerves; and in which the derangement of function during life corresponded with the lesion of the respective nerves. The lesion consisted in compression, in inflammation of the nerve, or in infiltration of its tissue with cancerous products.

IV. *Obliteration of the Thoracic Aorta.* (Wochenblatt der Zeitschrift der k. k. Gesellschaft der Aerzte zu Wien, Nov. 5, 1855.)

At a meeting of the Medical Society of Vienna, held on the 19th October, 1855, Professor Skoda introduced a man affected with obliteration of the thoracic aorta. In illustration of the lesion, the Professor exhibited preparations of a five-months' fœtus and of a new-born child, in which he indicated the point at which alone this anomaly can take place or has hitherto been observed. It is the point at which the ductus botalli communicates with the aorta and the short space intervening between this point and the origin of the left subclavian artery. During fœtal life, this portion is commonly narrower than the remainder of the aorta, and only acquires the same calibre after birth.

The individual in question was a man, aged forty-seven; a jeweller; of normal complexion, and throughout well nourished. On the whole, he enjoys good health, and has only come under clinical observation owing to his having, for three years past, suffered from some dyspnœa in making violent exertion. This is due to an insufficiency of the tricuspid valve, which has only been established for three years.

The following are the grounds upon which Professor Skoda has diagnosed a coexisting obliteration of the aorta:—In addition to the blowing murmur coincident with the impulse, and which indicates the above-mentioned insufficiency, a "peculiar vibration or whirring (schwirren) is to be perceived over the greater part of the thorax, partly by palpation, partly, as in the course of the intercostal arteries, by auscultation; it follows the impulse, and for that reason has its seat in the arteries. The vibration of the arteries of the thorax is due to their dilatation, as may be shown by touching the superficial epigastric arteries, which are much dilated and very tortuous. The beat of the crural arteries at the groin is very feeble, and no pulsation can be felt in the abdominal aorta."

These are the indications characteristic of obliteration of the thoracic aorta; the collateral circulation is carried on by the branches of the subclavian arteries, which must therefore be dilated. A large volume of blood passes from the anterior intercostals to the posterior intercostal, and by centripetal movement reaches the descending aorta, which is thus filled with blood sufficient to supply the arteries of the intestines, but not sufficient to produce distinct pulsations. The inferior extremities probably also receive a supply by the anastomosis of the superior and inferior epigastric arteries. No cyanosis is observed, because nowhere venous blood is introduced into the arterial system.

In connexion with this case, Professor Skoda made the following remarks:—1. That in examining the heart, we occasionally perceive murmurs which give rise to the assumption of valvular disease, while the heart is afterwards found healthy; and that the murmur was produced in the coronary arteries or in other arteries, in

the vicinity of the heart. Such errors can only be avoided by carefully attending, as in the case detailed, to the coincidence or non-coincidence of the murmur with the movements of the heart. 2. The circumstance that the nutrition of the individual was unimpaired, although the circulation in most of the organs must be, doubtless, slackened, proves that the deranged nutrition, so frequently coinciding with impediments in the circulation, does not depend solely upon the latter.

Professor Skoda was of opinion that the obliteration of the aorta was due either to a complete obliteration or absence of the corresponding portion of aorta in the fœtus, or to the contraction of the latter coincidently with the ductus botalli, owing to the exceptional extension of the tissue of this channel into the coats of the aorta. Professor Skoda maintained that the obliteration could not be set down to inflammation, as arteritis led, not to obliteration, but to aneurism. He referred to an analogous case which had occurred in his wards some years previously, where no disturbance of function was manifested until, accidentally, endocarditis supervened. Death occurred later from pneumonia; and the obliterated aorta has been preserved in the anatomical museum of Vienna.

V. *Statistics of Delirium Tremens.* By JOHN MACPHERSON, M.D. (Indian Annals of Medical Science, October, 1855.)

Dr. Macpherson draws attention to the great discrepancy prevailing in the statistics of writers on delirium tremens, with regard both to its frequency in both sexes, and to the mortality of the disease. He attributes this chiefly to a want of due classification—ebrietas or drunkenness being returned as delirium tremens. Calmeil states the rate of mortality at 5 per cent., Bougard at 19 per cent. Colonel Tulloch, in his report for 1853, gives the following per-centages of mortality:

Great Britain, infantry	17·6
,, cavalry	13·8
Bermuda	15·
Canada	7·94
Gibraltar	13·6
Malta	8·8
Nova Scotia	9·1

With regard to Bengal, the author says: "I believe I should not be far wrong in stating, that an army of about 18,000 strong sends more than 600 cases of ebrietas into the hospital in the year (slight cases are not sent), and that although the number of cases of delirium tremens is reduced by more than one-half, yet even now it rarely falls short of 150; and that the proportion in Bombay and Madras is not very different."

A return of admissions and deaths from delirium tremens and ebrietas in the General Hospital in Calcutta, from 1848 to 1852, and another of admissions and deaths from the same causes in the Medical College Hospital, during 1851-52-53, is given. The following are some of the more important results offered by the analysis of these cases:

That delirium tremens occurs in women and men in the proportion of 1 to 25; but that this difference is due to the difference of habits rather than of sex.

That in regard to age, the ratio is as follows:

	Cases.	Deaths.	Per cent. of deaths.
Ages from 20 to 25	34	4	9·1
,, 25 to 30	66	16	24·2
,, 30 to 35	48	11	22·9
,, 35 to 40	76	7	9·2
,, 40 to 45	62	6	9·6
,, 45 to 50	23	4	17·3
,, 50 to 60	7	0	
,, 60 to 65	5	1	

The greatest mortality is between the ages of twenty-five to forty, which is confirmed by the analysis of another series of sixty-four fatal cases. The percentage shows that there is no uniformity in the proportion of deaths to the number of cases.

There is no evidence to show that the season of the year exerts a definite influence on the occurrence of the disease, whereas the mortality very palpably varies with the temperature—it being more than double in the eight hot, than in the four cold months.

The apparent cause of death was as follows:

No. of cases.	
33	by exhaustion (often with coma).
18	by coma.
11	by fits (sometimes apoplectic, called sometimes epileptic).
1	died on nightstool.
1	found dead in bed.

Convulsions occurred in at least twenty of the above cases. One distinct case of paroxysmal opisthotonos occurred in a musician, who, during the intervals, was able to sit up and whistle tunes.

The post-mortem appearances of forty-five cases are not given with that statistical accuracy which we should desire; but they afford a confirmation to the received opinions of pathologists:

"As to the general frequency of the morbid changes, it may be observed, that the most constant were the red patches in the stomach; next, the opalescent appearance of the arachnoid; next, serous effusion; next, change of liver; next, of heart; next, of spleen; and lastly, of kidneys; but the last organs do not appear to have been always examined."

QUARTERLY REPORT ON SURGERY.

By John Chatto, Esq., M.R.C.S.E., London.

I. *On the Pathological Changes produced in the Urinary Organs in Egypt by the Distomum Hæmatobium.* By Dr. Bilharz. (Wien Med. Woch., 1856, Nos. 4 and 5.)

Dr. Bilharz, a physician practising at Cairo, forwarded several observations to Professor Siebold upon an entozoon peculiar to the inhabitants of Egypt, and which were published in the 'Zeits. fur Wiss. Zool.,' Band iv. pp. 53 and 454. In that paper he chiefly occupied himself with the zoological and anatomical characters of the parasite, while in the present one he publishes an account of the ravages it gives rise to. It is found in large numbers in the vena portæ, its roots and branches, as well as in the hæmorrhoidal and vesical plexus of the indigenous Egyptians, while myriads of ova are deposited in the mucous and submucous tissues of the bladder, ureters, and rectum. The entozoon belongs to the order trematoda, and the author denominates it *distomum hæmatobium.* Its length is about four lines, and the characters of the sexes are distinct. For these we must refer to the paper cited, our business being with the practical relation only. The ova are about $\frac{1}{18}$th of a line, and $\frac{1}{60}$th in breadth. The entozoon is nourished by the blood amidst which it lives, its intestinal canal always being found full of the corpuscles. It is of such very frequent occurrence among the indigenous Egyptians (the Fellahs and Kopts), that it would not be an exaggeration to state that one-half of the adults exhibit the worm or traces of its presence. It is not rare to meet with it among the Nubians also, but all of those who had come under the author's observation had lived long in Egypt. In regard to the Turks and Europeans residing in Egypt, the author has never met with a case among them presenting symptoms of suffering from the parasite, and in these races post-

mortem examination is not allowed. Among numerous autopsies of negroes, the author only met with the worm and its ova once.

The frequent occurrence of diseases of the urinary apparatus, and especially *lithiasis*, in the indigenous Egyptians, has been noted both by old and modern writers; and, in fact, among many pathological peculiarities which dissection reveals, scarcely any are more striking than the great frequency of the anatomical changes in these organs, especially the bladder and ureters.

Catarrhal Inflammation of the Bladder and Ureters.—The acute stage of this affection is seldom seen alone, there being, at least at certain points, degeneration perceptible. At these parts the mucous membrane is somewhat swollen and loosened, of a bluish or brownish red, surrounded by varicose capillaries, and covered with a layer of tough, transparent mucus, which often contains scattered blood-corpuscles. This can be easily stripped off as a pellicle, and consists of inter-adherent epithelial cells. Minute bloody points occupy the mouths of small bloodvessels that open on the surface. In all cases very large numbers of the ova of the distomum are here found, while the parts which are still normal do not exhibit these. They are found in the sub-mucous tissue, imbedded in the mucous membrane, in the pellicle formed by the adherent epithelial cells, and in the small coagula which project from the capillaries. The ova are either scattered, or massed together by means of a transparent gelatinous substance. They contain the embryo, sometimes in the mature and sometimes the immature state, side by side with burst shells, which are either empty or contain fat or lime. As consequences of this condition of the mucous membrane, M. Bilharz specifies induration, polypous growths, and ulceration.

1. *Induration* is the most frequent and marked of these. The mucous membrane becomes thickened, of a greenish or greyish yellow, devoid of blood, and of a leathery toughness. On nearer examination a number of minute, shining, burst granules are observed, giving the appearance of fine-grained sandstone, and under the microscope proving to consist of innumerable ova imbedded in the tissue, containing no living beings, but some filled with fat, and the greater part with lime. More or less tenacious layers cover the diseased portions, which contain also many ova filled as above, a few of them also containing uric acid. Pruner has already shown that there are frequently calculous deposits in these rough leathery patches. These concretions, of the size of millet-seed, consist chiefly of uric acid, and are sometimes slightly, and at others closely, adherent to the mass. Within the smallest of these, ova are sometimes found, but they are usually homogeneous. Besides these concretions there are often minute microscopic molecules deposited, which resemble urate of ammonia. This leathery degeneration may affect any part of the bladder, and frequently occupies half of its surface. In the ureters, ring-like deposits take place, so narrowing their cavity that a small catheter can scarcely be passed, while in one case complete obturation occurred. As a consequence of this obstruction, the rest of the ureter, the pelvis, and calices of the kidney undergo dilatation. This degeneration may occur at various points, the commonest being the vesical orifice, giving rise to the dilatation of the ureter throughout its whole course. 2. *Polypous hypertrophy* is frequently observed under the form of a fungoid prolongation of the mucous membrane, of the size of a millet to that of a bean, sometimes pediculated, and at others with a broad base; sometimes superficially lobed, and at others rounded, deep red, vascular, and often covered with incrustations, which consist in part of ova, in part of urinary salts. On dividing these, the mucous membrane is found thickened, and the sub-mucous tissue hypertrophied; both being traversed by an abundant capillary network, the vessels being not unfrequently dilated into tolerably spacious intercommunicating cavities. These cavities often contained the distomum, while the ova were found in great numbers within the parenchyma of the excrescences. This form of degeneration is found co-existing with the leathery, though seldomer than it, and it is rarely met with in the ureters. 3. *Ulceration* has only been met with in one case in a portion of the bladder affected with acute inflammation; the

ulcer, which contained masses of ova, much resembling those observed in the intestines in dysentery.

The author expresses his conviction that the deposit of the ova of the distomum hæmatobium is the immediate cause of these pathological appearances; inasmuch as in all the cases in which they have been observed, large quantities of ova have been found, the appearances have been proportionate in amount and severity to the number and degree of development of the ova, and such appearances are only observed among individuals suffering from the presence of the distoma, which is only found in certain races of men.

The *symptoms* of this very chronic affection, which may last for years, are in part common to simple chronic catarrh of the bladder, and in part derived from the presence of the distoma. Among the former, constant sense of weight in the hypogastric region, exacerbated at times into severe and burning pain; sensibility to pressure, and very persistent though but slight hæmaturia. The catheter passing over the roughened spots may give rise to the suspicion of stone, but the dull rubbing feeling and the immovability of the part enable us to distinguish, while a finger passed per anum may often bring the portion of bladder between it and the catheter. The easiest means of diagnosis is furnished by the microscope, the ova being detected by it in the mucous sediment of the urine, and especially in the small coagula of blood that accompany this. In regard to *treatment*, the local pains are best relieved by opium, while the radical cure has several times been attempted by endeavouring to poison the parasite with long-continued doses of calomel. Thus far, the author has had no case long enough under his observation to determine the amount of success. *Lithiasis*, owing to the frequency with which uric-acid concretions are met with on the surface of the parts that had undergone the leathery degeneration, being mostly but lightly attached, they might be expected to be easily separated so as to form nuclei for calculi. The obstructions too in the ureters would favour deposition from the urine. Dr. Heinrich Meckel, examining Professor Reyer's collection of Egyptian urinary calculi, has found one containing a large quantity of the ova.

II. *Cases of Gun-shot Wound of the Orbit.* By Drs. WARREN and BETHUNE. (Boston Medical and Surgical Journal, vol. liii. p. 226.)

At a meeting of the Boston Medical Society, Dr. J. M. Warren related the following case:—A man, aged thirty-five, received, in 1847, a severe wound of the head, from the breech-pin of his gun, which exploded. He states that the left eye-ball was blown out, the upper part of the socket destroyed, so as to expose the brain, and a communication formed between its back part and the nasal sinuses. His recovery was very slow, and he suffered much from pain in the head, dizziness, &c. The nose was entirely stopped up, so that he could not breathe through it. At the end of rather more than a year, a firmness was felt on the hard palate, and something seemed to obstruct the posterior fauces. A screw was found projecting through the roof of the mouth, and an incision having been made, the whole breech-pin, with the screw projecting from it at a right angle, was removed, after remaining there unsuspected during eighteen months. It was three inches and a quarter long, and almost three inches in diameter. Admitted into the hospital, December 1, 1854, the left eye-ball was found to be gone, the eyelids, apparently uninjured, remaining open. Free communication took place with the mouth and nose by means of an aperture at the back of the socket, the edge of this being irregular where the bone had been destroyed. He could only speak intelligibly when he closed the eyelids by pressing his fingers into the socket, preventing the passage of the air from the mouth; and even then, owing to the fissure of the palate, he was not easily understood. Swallowing was difficult, and required an upright position of the head.

In order to obstruct the passage of air through the socket, the tarsal car-

tilages were removed (the patient being etherized), the edges brought together with sutures, and collodion applied—the speech becoming at once much improved. The fissure of the palate was closed by operation, the next week, but without success, owing to the intractibility of the patient. A repetition was entirely successful. The eyelids united, with the exception of an aperture the size of a pin's head at the inner angle, through which no air passed, but which gave rise to a thin discharge like tears, apparently indicating the remains of a small portion of the lachrymal gland, although all the part of the orbit to which this is attached seemed to have been destroyed. The patient left, March, 1855, with his voice in a great measure restored.

Dr. Bethune was called to a young man who had tried to blow his brains out six days previously. The ball carried away the right eye-ball, and, going behind the upper part of the nose, passed out of the left orbit, carrying away about a third of the left eye. No severe general symptoms followed; the globes suppurated favourably; and at the period of the relation of the case to the Society, about a fortnight after the wound, there seemed every probability of recovery.

III. *On the Treatment of Fistula Lachrymalis.* By M. TAVIGNOT. (Moniteur des Hôpitaux, 1856, No. 16.)

M. Tavignot is of opinion that fistula lachrymalis is the result of an organic disaccord between the chemical properties of the tears and the physiological properties of the naso-lachrymal mucous membrance. This explains both the obstinacy of the disease and the relative efficacy of that treatment which most protects the mucous membrane from the contact of the tears. We find the tears will not flow through the canal, even when it has been dilated by surgical means; while the presence of a foreign body in the canal causes the cessation of the accidents; this being better tolerated than the tears, the access of which it prevents. These various modes of treatment only succeed after long preseverance has modified and transformed the characters of the mucous membrane.

In place of occupying so long a time in obtaining this alteration in the sac and the duct, the author recommends that the gland itself should engage our attention. Where the affection does not arise from scrofulous disease, when it is amenable to appropriate remedies, he is unaware of any means of restoring harmony to the parts, although in the early stages antiphlogistics and topical remedies do much to remove complications and procure temporary relief. The contact of the tears can only, by the various means usually employed, be temporarily prevented, while obliteration of the passages is difficult to obtain, and is attended with stillicidium. The lachrymal gland itself may, however, be removed without inconvenience. It is, in fact, the orbital portion that is alone to be removed; and the palpebral granules that remain, suffice, with the mucus of the membranes, to lubrify the surface of the eye. The operation is inoffensive. Very soon great amelioration ensues, after the immediate effects of the operation have passed away, and this may go on to a definitive cure When this is delayed, owing to the still disordered state of the passages, iodine injections should be employed.

IV. *Glycerine as a Dressing for Wounds and Ulcers.* (Gaz. des Hôpitaux, 1856, Nos. 144 and 146.)

M. Denonvilliers has recently brought this under the notice of the Paris Société de Chirurgie, speaking highly of this substance as forming so very clean a dressing, and which, not adhering to the parts, is easily removed. To its extreme cleanliness he attributes much of its efficacy, contrasting it with the cerate dressings, under the use of which there takes place around the edge of the wound a mixed accumulation of pus, cerate, and epidermis, forming a thick crust, the removal of which creates irritation and retards recovery.

M. Demarquay stated that he had also employed it with good effect in hospital gangrene, in open buboes, syphilitic ulceration, ill-conditioned ulcers of the mouth, &c. All these sores healed rapidly, seeming to imply a certain amount of local action, which the astringent and stinging taste of the substance accounted for. It may also exert some influence on erysipelas, or at all events the occurrence of this during its use is rare. It undoubtedly modifies the amount of suppuration; and when the supply of glycerine has run short, the wounds next day have secreted more pus, and assumed a worse aspect.

M. Brocas, while advocating the use of glycerine as a clean substitute for cerate, deprecates the vaunting it as a panacea for the various forms of wounds. As to hospital gangrene, it is now met with in a far milder form than that described by the classical authors, and may become cured by hygiene alone, the glycerine merely allowing the irritated parts to be left at rest. Believing this disease may be propagated by miasmata, glycerine may also act by protecting the wound from the contact of the air; for excellent practical results have followed when this has been prevented, by covering the patient's wounds with gummed gold-beater's skin.

M. Dallas stated that he had employed glycerine at Odessa since 1851, where, as in other parts of Russia, it has become a highly-popular remedy, not only as a dressing for wounds, but in a variety of affections. He has found it also very useful in many cases of deafness, in various cutaneous diseases, especially when attended with itching; and in some forms of ophthalmia.

M. Robin observed, that, deceived by its mere appearance, glycerine has been compared with the oils, and been supposed to act as an inert substance, protecting wounds as neutral fatty bodies do. It is, however, a body analogous to alcohol; and so far from being inert in its action on the organic tissues, it intimately penetrates these more rapidly than water does, and exerts a special action on several of them.

V. *On a New Operation for Phymosis.* By M. Bonnafont. (Gaz. des Hôpitaux, 1856, No. 2.)

The usual operation of circumcision for phymosis requires a separate division of the mucous membrane, which is attended with great pain. M. Bonnafont, surgeon to the military hospital of the Roule, where he meets with many of these cases, operates as follows. An assistant draws the prepuce forwards, endeavouring to enlarge the orifice as much as possible, through which the operator introduces, by means of a director, &c., either fine charpie or tow, until the whole cavity is filled. This done, the operator may circumcise without fear of injuring the glans. M. Bonnafont, in order to avoid the small artery of the frænum, which sometimes gives rise to an abundant hæmorrhage, makes his incision slightly ovular, from above downwards, and from behind forwards. If it be thought desirable, the skin may be first incised, so that the mucous membrane may be divided somewhat more backwards—a procedure to which some attach importance. For twenty-four hours cold applications are made, no sutures being employed.

VI. *On the Congelations observed at Constantinople in the Winter of* 1854—5. By M. Legouest. (Rev. Médico-Chir., xviii. pp. 270 and 335.)

Congelations, in all their stages, were frequently observed among the troops sent home from the Crimea. The cold to which they had been exposed during December, January, and February, had not been very intense, and had been accompanied by much wet. Almost without fuel, and insufficiently sheltered, many had passed a fortnight without change of clothing, alternating long periods of immovability, their legs half buried in snow at the trenches, with the frozen slush of their bivouacs.

The first stage of ordinary childblain was rarely met with, and the slow-healing ulcers which sometimes resulted were advantageously treated by tar ointment. A more common result of the first degree of cold, and usually resulting from the long retention of wet clothing, was the production of a reddish-brown induration of the skin, which extended over a considerable portion of the external surface of the feet and legs. It was of a very chronic nature, the sensibility of the parts which was quite destroyed, not being restored sometimes for five or six months. Stimulating frictions and warm clothing formed the best treatment.

The second stage of congelation was of much more frequent occurrence, and was characterized by the production of phlyctænæ containing a purulent serosity, or, more frequently, blood. These last have only been met with on the feet, being usually found at the plantar surface, and where the epidermis is thickest. The entire heel, or anterior part of the foot and toes, may be implicated, the epidermis being stained black. The effusion feels hard, is bounded by no areola, and sounds like mummified tissue on percussion. On opening it, the blood does not issue. Viscous at first, it shortly concretes into a very black deposit resembling dried varnish, and scaling off. Its detachment takes a long period to effect, and when completed, a new dermis, with epidermis, may sometimes be found beneath; while at others, exquisitely sensible and exuberant blackish granulations are found springing up from an ulcerated surface. When not seen early, the parts, prior to the detachment of the epidermis, can with difficulty be distinguished from dry gangrene.

A third stage is marked by spots of a blackish-blue colour, the size of small pieces of money, and which are sometimes placed amidst healthy structures, and at others amidst the brown induration of chronic frost-bite. They are soft eschars, visible through the transparent epidermis; and, becoming detached at a remote period, are replaced by fungous, bleeding granulations. At other times they fall as if they had been punched out, leaving reddish, nearly dry, tissue beneath, having no tendency to cicatrization. These differences in the fall of the eschar seem to be due to the degree of depth to which the alteration of tissues has taken place, this being greatest in the first case. The patients complain of little pain. These eschars were very often multiple on the same foot, the projecting portions being especially liable to them, the bones and joints of the toes often suffering.

When the cold acts with still greater intensity, another form of gangrene results, which may be called sudden gangrene, and differs essentially from that which follows reaction after exposure to cold The parts are of a deep livid colour, somewhat tumified, and gorged with fluid, all sensibility having disappeared. Entire toes, the whole foot, or even part of the leg, may be attacked; but this gangrene possesses no invading tendency. After awhile, varying in individuals, but always long, the parts desiccate, shrivel, and mummify, acquiring all the hardness and resonance of wood. A slight inflammatory circle extends just beyond the line of demarcation, redness, and liability to gangrene on pressure; sometimes, however, extending as far as 15 to 20 centimètres. This form bears the greatest analogy to dry or senile gangrene. Some patients, however, pass through all the phases of soft gangrene, which ensues as a consequence of a certain amount of reaction due to the less amount of cold, or the more energetic and active condition of the subject. But the author has never observed these secondary gangrenes putting on the rapid invading characters met with in traumatic gangrene.

At the numerous autopsies performed, besides the usual appearances observed in the soft parts, the bones were found to have become friable, and to have undergone rarefaction of their substance, the areolæ imbibing a yellowish, glairy, sanguinolent, or purulent fluid. This change was best seen towards their extremities, where they could be easily divided by a scalpel. It was rare for a bone not to suffer during a mortification of the tissues, even when a certain thickness of these covered it; and when once attacked, its entire length usually suffered. The latter

circumstance seriously compromised the existence of parts at first uninjured by the cold. Amidst the depth of the adipose tissue of the plantar region, in patients who had had only some toes frozen, or in others in whom the feet were intact, small effusions of coagulated blood were often found, varying in size from a millet seed to a barbary, which last they much resembled. Similar effusions, though smaller and less well-defined, have been met with in the vicinity of eschars and ulcers, and in chronic frost-bite. They were also very often met with in the cellular tissue surrounding the nerves and vessels, or in their very sheaths. M. Tholozen regards them as of scorbutic origin.

The account of congelations given by M. Legouest differs from that of some of his predecessors, and he believes that epidemic *scorbutus*, though not the cause of what he has related, has much modified appearances. Speaking of the general symptoms he witnessed, he states that it is often most difficult to distinguish between the remote effects of cold and scorbutics. Most patients exhibited much emaciation and a jaundiced colour, and complained of severe pains in the limbs. Great slowness of movement and torpidity, and a leaden sleep, were observed in most. Many were attacked with incoercible diarrhœa, and some with painless dysentery, and these cases were very fatal. Permanent improvement took place in most, while in others their condition became aggravated, and all the symptoms of scorbutics were present, except the affection of the gums, which was rare.

Passing over the treatment of the slight congelations, the author cautions surgeons not to mistake the sub-epidermic sanguineous effusions for the mummified gangrene they so well simulate, and remove parts still living. As to the gangrene itself, its treatment is as under other circumstances, the author believing he has derived some advantage from the use of solution of sulphate of iron, which solidifies the eschars and corrects their smell. He prefers, as a general rule, temporizing to amputation, coming to nature's aid, however, with regularizing operations, thus saving the patient much suffering, and diminishing the time he has to pass in the dangerous atmosphere of a crowded hospital.

VII. *On Continuous Local Tepid Baths in the Treatment of Wounds after Operations.* By Professor LANGENBECK. (L'Union Médicale, 1856, Nos. 11 and 12, from the 'Deutsche Klinik.')

By various apparatus, constructed in zinc or vulcanized caoutchouc, Professor Langenbeck contrives to keep the wounded part in constant contact with tepid water. The apparatus must not be resorted to where secondary hæmorrhage is feared, and thus its application to stumps after amputation should be usually delayed for eighteen to twenty-four hours. In several cases it has, however, been resorted to, even before the patient has recovered from the anæsthesia, this saving him from the pains after the operation and from the dressing. The part must be removed from the bath if hæmorrhage occurs. When applied immediately, the water should be at a temperature of from 10° to 13° C.; and if the water is not renewed it acquires in from three to twelve hours a temperature of 15° to 31°. After the first day the latter is that which is most agreeable to the patient; and later, when the wound begins to clean and suppurate, a temperature of 31° to 35° is to be maintained. The patient's sensations usually form the best guide; and the temperature can be maintained pretty equable by covering the apparatus, or by adding warm or cold water from time to time. In summer, with a temperature of 20° to 25°, the water rises in twelve hours to from 34° to 37°; and in winter, at 17° in the room, the water falls to 31° or 30° in the twelve hours. As a general rule, the water requires renewing only night and morning; and if there is a large wound, with abundant suppuration, it should be well washed with a chlorined solution.

The advantages of the procedure are thus summed up:—1. Diminution of pain subsequent to the operation. As long as the parts are kept under water, whatever

the size of the wound, no pain is complained of, although this at once becomes severe when they are exposed, general shivering then, too, coming on in a quarter of an hour. The author has never observed the shiverings, so frequently met with after large operations, when the water was at once applied. No dressings are required, the sutures are removed under water, and the greatest cleanliness is secured. 2. The traumatic and suppurative fever is much diminished in intensity. 3. The removal of the secreted fluids is favoured, and their decomposition prevented. If the wounds are deep or sinuous, injections must be used, and the free issue of the discharges must be secured by the usual means. 4. Cicatrization is more prompt. 5. Professor Langenbeck believes the means to be operative in preventing purulent infection.

VIII. *Tincture of Iodine in Bubo.* By M. PIRONDY. (Bull. de Thérapeut., xlix. p. 276.)

M. Pirondy relates 16 cases in which he employed this means, which, he says, often leads to the resorption of pus. Having removed the skin by means of a blister, he dresses the part two or three times a day with charpie dipped in tincture of iodine, diluted with water according to the sensibility of the patient. In 11 of the 16 cases, resorption took place at the average period of twenty-three days. In 5 a spontaneous opening occurred, yet, owing to the detachment of the integuments being less, and their different layers being rendered firmer by this kind of tanning process, cicatrization took place more rapidly than usual, complete healing taking place in a medium period of forty days.

IX. *On Reduction of Dislocated Maxilla.* By Dr. LEO. (Schmidt's Jahrb., Band lxxxvii. 233.)

Dr. Leo strongly recommends the following procedure, on account of its simplicity and easy execution. The surgeon places himself behind the patient (who is sitting) on the right side, taking his head under the left arm and pressing it against the chest. He passes the thumb of the right hand into his mouth as far as the last teeth on the right side of the jaw, surrounding the external side of the jaw with his other fingers, and exerts moderate pressure downwards. As soon as the jaw becomes moveable he presses it backwards. In dislocations of the left side he fixes the head with his right arm, and replaces the jaw with the left hand; and when the dislocation is double, he reduces first one side and then the other.

X. *On the Orange-coloured Flocculi observed in Recent Wounds.* By PROFESSOR ZEIS. (Gaz. Médicale, 1855, No. 50.)

Professor Zeis's attention was called to this appearance six or eight years since. It is never observed before the fourth day, and it persists from four to eight days. Filaments are found covered with matter of a brilliant orange colour, and of the consistence of good pus, the wound never being entirely covered with this mass. When we try to remove it, a portion always remains adherent at the bottom of the wound; next day it is found reproduced, even though not a single drop of blood has become mingled with the pus; but when it has once disappeared of itself, on the establishment of free suppuration and granulations, it never reappears. The author thinks he has oftenest seen it in lacerated wounds, and when aponeuroses have been exposed; but he does not regard it as a cause for unfavourable prognosis. Under the microscope, an amorphous substance is perceived with the pus globules, which are partly destroyed, as also fatty drops (margarine). Some contain brown or orange-coloured rhomboid crystals, which present all the characters of hæmatoidine. Sometimes crystals are not discoverable, an unorganized

brownish mass being indeed the commonest appearance, amidst which crystals are rarely seen. In one of the preparations exhibited the crystals were large, and in enormous quantities. Dr. Zeis concludes that the composition of the mass is the same in both cases, conditions favourable to crystallization being absent in the one.

M. Robin believes the orange colour of the filaments to be due (1) to the presence of crystals of hæmatoidine, (2) to that of an amorphous colouring matter or liquid, which would appear to be either amorphous liquid hæmatoidine, or rather the colouring matter of the blood separated from the red globules destroyed during the eliminating process, or after minute capillary hæmorrhages. That is to say, it is the colouring matter (hæmatoine), naturally semi-liquid and coagulable, which has not yet undergone the special chemical modification which causes it, in certain pathological conditions, to pass into the state of hæmatoidine, a solid, slightly coagulable and crystallizable body.

XI. *Clysters of Acetate of Lead in Hernia.* By D. Ulmann. (Schmidt's Jahrb., Band lxxxvii. 335.)

Dr. Ulmann, while relating a case of strangulated hernia, which did well, although the operation was long delayed, and it became necessary to tap the intestine to discharge the air before it could be returned, takes the occasion to state the great benefit he has derived in his practice from the use of enemata of acetate of lead, which often soon rendered the taxis successful, though this had been already used in vain. It induces a contraction of the canal, which is propagated to the imprisoned part. The intestine should be first cleared out by a common enema, and not more than three or four ounces of the lead injection should be thrown up, as its utility entirely depends upon its being retained.

QUARTERLY REPORT ON MIDWIFERY.

By Robert Barnes, M.D. (Lond.)

Physician to the Metropolitan Free Hospital, late Physician-Accoucheur to the Western General Dispensary.

I. Menstruation.

1. *On the Period of Puberty in the Negro Race.* By Robert Clarke, Esq. (Journal of the Statistical Society, March, 1856.)
2. *Case of Early Menstruation.* By J. O. Bronson, M.D. (American Medical Monthly, September, 1855.)

1. Mr. Robert Clarke says, "With respect to the period of puberty in the Negroes, all my inquiries have tended to show that it commences about the age of ten or twelve years. Girls who have arrived at this age, and much beyond it, may be occasionally observed walking the streets (of Sierra Leone) naked, with the exception of a long strip of white calico, which hangs before and behind below the knee, from a circlet or zone of beads which surrounds the loins, and which scarcely covers the genital organs. These streamers are the signals of the girl's being marriageable. During the presence of the catamenia they are deemed unclean, when a coloured strip of calico is substituted, to intimate the presence of the secretion."

2. We cite the facts observed in the case of Dr. Bronson, reported as one of early menstruation. The subject is named Phœbe Anne Baker, born the 19th of January, 1851, in Sing Sing, Westchester County, N. Y. At the age of ten months her menses appeared, accompanied by the usual signs and developments,

and have continued with healthy regularity ever since. The girl is large for her age, with light brown hair and complexion, and blue eyes. Her form is mature. Her mammæ are prominent, the size of an orange; pelvis wide; and her pubis covered with hair. In fact, she is a woman in physical, and a child in her mental developments. She is quite unconscious of her condition. The catamenial discharge is healthy in colour, character, and quantity, and not accompanied with pain. Nothing concerning the parents, or otherwise, was elicited, tending to throw light upon the causes of this early establishment of the female function. This case, says Dr. Bronson, cannot be classed with those of disease simulating menstruation, but is a *bonâ fide* case of infantile puberty.

II. Gestation and Labour.

1. *On the Depth at which the Placenta is implanted in the Uterus; and on the Stage of Extension of the Placenta.* By V. Ritgen. (Monatsschr. für Geburtsk., October, 1855.)
2. *On Parturition in the Negro; and Obstetricy in Sierra Leone.* By Robert Clarke, Esq. (Journal of the Statistical Society, March, 1856.)
3. *On the Use of Chloroform in Midwifery.* By Dr. Krieger. (Verhandl. d. Ges. für Geb., 1855.)
4. *On his Method of Protecting the Perineum (in Labour).* By V. Ritgen. (Monatsschr. für Geburtsk., November, 1855.)
5. *A Case of Spontaneous Version of the Child.* By Dr. Benda. (Verhandl. d. Ges. für Geb., 1855.)
6. *A Case of Extra Uterine (Tubal) Gestation.* By Samuel L. Kurtz, M.D., of Phenixville, Pa. (Amer. Journ. of Med. Science, October, 1855.)
7. *A Case of Amniotic Dropsy terminating fatally.* By George Amerman, M.D. (American Medical Monthly, September, 1855.)
8. *A Case of previous Separation and Expulsion of the Placenta.* By Dr. E. V. Siebold. (Monatsschr. für Geb., Oct. 1855.)
9. *The Statistics of Placenta Prævia.* By James D. Trask, M.D. (Transactions of the Amer. Med. Assoc., 1855.)
10. *A New Principle and Method of Treating Placenta Prævia.* By Robert Barnes, M.D. (Lancet, and Med. Times and Gaz., January, 1856.)
11. *My Method of Treating the Placenta.* By Dr. Cohen. (Monatssch r. Geburtsk., April and May, 1855.)
12. *On Dr. Cohen's Paper.* By Dr. Crede and Professor Hohl. (Same Journal, 1855.)

1. The memoir of Von Ritgen is an elaborate and interesting illustration of the various seats of attachment of the placenta, other than to the neck of the womb. He refers to the method discovered in recent times, of determining after delivery the height at which the placenta was attached, by measuring the distance of the rent in the membranes made by the passage of the liquor amnii and fœtus from the margin of the placenta.

The bag burst at the edge of the placenta in 22 cases. It burst at one inch from the edge in 8 cases; between one and two inches in 12 cases; two inches in 7 cases; between two and three inches in 16 cases; three inches in 5 cases; between three and four inches in 4 cases; four inches in 6 cases; between four and five inches in 8 cases; five inches in 3 cases; six inches in 6 cases; and eight inches in 3 cases.

It follows, that since the distance of the edge of the placenta from the rent is absolutely decisive as to the distance of the edge of the placenta from the os uteri, that the edge of the placenta rested on the os uteri in 22 cases, and was within one inch in 32 cases, within two inches in 49 cases, and so on.

This proves that the placenta has commonly a much lower seat than has hitherto been believed.

It also appears that smallness of the ovum has a closer relation to lower seat of the placenta than is to be accounted for by the simple diminution of all the dimensions of the uterus.

The Period of Exclusion of the Placenta.—V. Ritgen says, that instructions were given in the hospital for many years, not to remove a detached placenta without the express permission of the director. The reason was, to ascertain whether the leaving behind the detached placenta would cause mischief to the mother by absorption of the dead matter. This rule was followed for a time, so far as to allow the placenta to remain several days, and until the foul smell became insupportable; but at a later period it was not carried to this extreme, after it was ascertained that *no absorption of decomposing constituents of placenta ever took place, except in cases of fleshy growth of the placenta to the uterus.*

Summarily expressed, the detached placenta remained fifty-two times, or in about one-half the cases, less than four hours in the uterus; and in the other half, between four and fourteen and a half hours.

The spontaneously completely detached placenta was removed artificially in 3 cases on account of hæmorrhage. In 1 case it was removed on account of spasmodic pains. In 2 cases after operations. In all the rest, the placenta was removed on account of severe after-pains, heavy pressure of the vagina, difficulty of micturition, disturbance of rest and sleep.

[We cannot but express the hope that the Professor is satisfied with these results, and that he will not consider it necessary to carry this experiment further. —Rep.]

2. Parturition in the negro has been generally represented as an easy process, and soon accomplished; but Mr. Clarke's observation is quite opposed to this opinion, for the negro woman suffers as much during child-birth as the female of civilized countries, and unfortunate cases have happened where the woman has died undelivered. Instrumental assistance is as often required; and some of the worst cases of laceration of the perineum, recto-vesical fistula, neglected prolapsus uteri, and even laceration of the soft parts to such an extent as to lay the vagina, rectum, and neck of the bladder into one common cloaca, were brought to hospital for medical treatment. Among the natives the practice of midwifery is confined to aged women. The patient is generally placed on a mat on the floor, close to the fire, with a woman behind to support her, in a semi-recumbent posture. The external parts being freely lubricated with oil, the midwife seats herself before the patient, and during a pain encourages her to bear down strongly, at the same time compressing the back by pulling together with all her force the ends of a shawl previously wrapped round the loins. She also from time to time rubs the abdomen with her hand, smeared over with "douch-grease," or shea-butter; and if the delivery is slow and lingering, she causes the woman to get up and walk about, or bathes the belly with a foment of country leaves and herbs. They never think of supporting the perineum; but some of them have been known to snip it to facilitate delivery. To hasten the expulsion of the placenta, she is directed to retain her breath and to blow strongly into her hand. If this does not succeed, they bandage the abdomen tightly, make her stand upright, and shake her well; and sometimes they lave her abdomen with cold water, to constringe, as they believe, the womb, and to cause the placenta to separate. Mr. Clarke has known the woman placed upon her hands and knees, the cord being fastened by a string to one of the toes; and while in this position the nose was irritated with a feather, and the fauces tickled in no very gentle way with the handle of a spoon or fork, to excite vomiting, and thereby bring on uterine contraction.

3. Dr. Krieger's paper adds a number of valuable facts to our knowledge of the use of chloroform in labour. In some introductory remarks he declares himself an advocate for the induction of anæsthesia, not limiting himself to operative midwifery. He says that this practice has made but little way amongst the obstetric faculty of Berlin.

Since the 13th of December, 1847, when he first administered chloroform, he has conducted 235 labours; and it is important to remark that these did not occur in hospitals, where the mortality attending childbirth, especially in Berlin, is greatly raised by circumstances connected with this condition, but in the ordinary course of practice. He gave chloroform more particularly in 96 cases: in 23 of these the forceps were used, in 1 case of which after perforation of the head, in 1 for eclampsia, and in 3 after turning by the feet; in 10 cases turning was performed; in 5, prolapsus of the cord; in 2, adherent placenta. In 43 cases no manual or instrumental aid was called for. Of these latter the last cases were very tedious and the patients much exhausted; in 4 others the pains were spasmodic, painful, and without influence in promoting labour; 2 others were so restless as to impede labour; in the 17 remaining the chloroform was partly given to satisfy the demands of the patients.

The mode of use was directed by the end in view. In the case of an operation, about a drachm was poured at once upon the cloth, so as to produce full narcotism as quickly as possible; if it were only wanted to assuage pain, ten or fifteen drops were used at the onset of each pain, and the cloth was withdrawn on the cessation of each pain. In the last manner, Dr. Krieger says he has gone on for three or more hours without any bad consequence for mother or child. We had prepared a short abstract of Dr. Krieger's cases, which would constitute a valuable record, but are compelled to refer the reader to the original.

Out of the 96 cases of anæsthesia by chloroform, death of the mother happened five times within the puerperal period: once from rupture of the uterus, once from epistaxis, twice from peritonitis, once from lung-paralysis, probably caused by metro-phlebitis.

[The frequency of metro-peritonitis in these cases deserves to be borne in mind. Also the occurrence of hæmorrhage.—Rep.]

Dr. Krieger concludes with a somewhat *naïve* remark upon laceration of the perineum. It has, he says, been urged as one of the advantages of chloroform, that it serves to secure the perineum from injury. Dr. Krieger believes in this, and thinks he has saved several perineums by its means. But he cannot but wonder that, in revising his notes, he finds the great number of *sixteen injuries to the perineum* out of 96 cases of chloroform-labours: 2 of these happened in cases without artificial aid, and 14 forceps-labours. [The Reporter thinks it worth calling to mind, that out of 27 cases in which chloroform was used by Dr. Sachs, in the Berlin Lying-in Hospital, no less than four cases of rupture of the perineum also occurred.]*

4. Dr. von Ritgen refers, in a memoir of great length and detail, to a method proposed by him in 1836 for the security of the perineum during labour. He states that the proceeding he recommended has been misunderstood by some, and is generally but little known; and he also adduces his subsequent experience to prove its utility. He defends his method against those who have represented it as consisting in the making incisions in the margin of the ostium vaginæ, so as to widen the orifice. He again explains in what his method does consist. It never entered into his mind to split the labia pudendorum. He leaves the perineum quite untouched, and *makes small scarifications in different spots*, from the labia majora to the upper edge of the constrictor vaginæ. His object is to effect the dilatation of the ostium vaginæ by *several superficial* incisions. The best instrument for these scarifications is a bistoury with a test-blade of four inches long, slightly curved, forming on both sides a somewhat rounded ridge. The free end of the blade is blunt for half an inch, without a knob, but the point rounded off. Then comes the cutting edge, an inch long, on the concave side of the blade. The rest of the blade has no cutting edge.

The scarifications are performed most safely and easily when the patient lies on

* Lancet, 1850: Anæsthesia in Natural Parturition, with an Analysis of twenty-seven Cases where Chloroform was administered by Dr. Sachs. By Robert Barnes, M.D., &c.

her left side, with a round pillow between her knees. They should be made during the pains. The following is the seat and nature of the scarifications, and the mode of performing them:—The head must be at the orifice of the vagina; the head is to be held back by the left hand; the knife is then passed flat between the head and the outer border of the orifice of the vagina, during an interval between pains; the cutting edge is turned outwards during a pain, so as to make a small transverse nick in the border of the orifice of the vagina. Before the knife is withdrawn, as many more nicks are made as are necessary on one side. The range of the scarifications is between one inch from the transverse ligaments behind, and one inch from the clitoris in front. Dr. von Ritgen has found that each scarification, being only a line deep, yields, by the dilatation of the orifice, a stretching to the extent of from two to four lines; so that fourteen such scarifications would be an aggregate addition to the circumference of the orifice of about two inches.

As to the results of experience.—Dr. von Ritgen cites the journals of Dr. Theodor Faustmann, incorporated in the eight 'Inaugural Theses' of that gentleman, published in Giessen in 1851. From his tables it appears that, in the lying-in institution under Dr. von Ritgen's direction, up to the end of 1850, laceration of the perineum had occurred 190 times in 4875 labours. The length of the rent was 53 times a quarter of an inch, 41 times half an inch, 15 times three quarters of an inch, 53 times an inch and a half, and once the perineum was torn to the wall of the rectum, without dividing it; the rent, however, spread on either side of the rectum. Thus, out of 4875 labours, 54 serious lacerations took place. Of these 54 cases, 45 happened before the introduction of the scarification of the vagina in 1828, and 9 since. Since this time these 9 cases happened in 3464 labours, and scarifications were employed in 266. If from these 9 cases we subtract 3 in which the rent began in the middle of the perineum and then spread towards the anus and transverse ligaments, there remain 6 severe cases of the ordinary kind out of 3464 labours.

Since 1851 to the present time, 757 labours have occurred, and the scarifications have been made 83 times. *In this time not a single laceration of the perineum, even of the slightest kind, has happened.*

5. Dr. Benda's case of spontaneous version is interesting. A woman was found with an arm-presentation, the waters having escaped. The right arm, as far as the half of the humerus, was outside the vagina, little swollen. Dr. Benda diagnosed on careful examination the second shoulder-presentation. In spite of attempts by himself and his colleague, Dr. Lehfeldt, it was impossible to pass the hand into the uterus to seize the foot. While waiting for chloroform, the following process, which took place very rapidly, was minutely observed. The hitherto relaxed perineum was suddenly distended, and the presenting right arm was drawn back into the genital organs; at the same time that the pelvic end of the child rose, the right side of the abdomen came first against the perineum, then the pubic end, and during a half-revolution upon the long axis the back was directed against the symphysis, the left hip was evolved over the perineum, whereupon quickly and in one pain, the legs folded upon the abdomen, and the head bent upon the breast followed. Thus, out of the second shoulder-presentation, and by strong uterine contractions alone, working in a capacious pelvis, the first breech-presentation had been developed; a half-turn upon the transverse axis taking place, as well as a half-turn upon the long axis. The child, at first asphyxiated, recovered perfectly.

[This case is a proof that the account given of spontaneous turning by Denman is in some cases correct, and that the mode described by Douglas is not that universally followed.—Rep.]

6. The following is an abstract of Dr. Kurtz's case. Dr. Kurtz was summoned, in July last to see a young woman who was suffering violent pain, and was thought

to have cramp of the stomach and bowels. She was married last New Year's-day. More than three months since menstruation ceased, appearing again on the 2nd of July. The discharge, on this occasion profuse, lasted but twenty-four hours. About two months since she began to have irregular pains in the right iliac and pelvic regions, augmented by exertion or coughing. On the 12th of July she was suddenly seized with pain in the side. When seen by Dr. Kurtz she was much prostrated, deathly pale, skin cold, a clammy sweat, pulse at times imperceptible, weak and fluttering, 120 to 130 in the minute; breathing hurried; nausea, had vomited once. The pain, which extended from the epigastric to the right iliac region, at first was intermittent, and like labour-pains, but was now continuous, and much increased by pressure. Abdomen full, somewhat tympanitic. Uterus in proper place; os, size of a shilling; no discharge. Opiates and enemata given. She died at four A.M. next day.

Autopsy.—Abdomen filled with blood and bloody serum; clots filling the interstices of the viscera; about three pints were removed. The fœtus, with membranes perfect, seen floating immediately above the uterus. This pushed aside, a large tumour presented itself in the right pelvic region, which proved to be the enlarged Fallopian tube, which had contained the fœtus up to the time of its bursting. The walls of the tumour were very vascular, on one side thick and strong, on the other thin. The ovarium of the right side enlarged; the tubes apparently elongated. The obstruction occurred in the external half of the tube. The fœtus was well-formed, eight inches long when extended. The period of gestation was estimated at from three to four months. The womb, which was larger than the non-gravid womb, was apparently healthy, and 1¼ in. in thickness. The canal of the cervix was filled with a ropy fluid, and by pressure on the womb it discharged a claret-coloured mucus.

7. Dr. Amerman's case of amniotic dropsy is a rare example of death from this complication of gestation. Jane Lewis, aged twenty, admitted into Bellevue Hospital, under Dr. Barber, on the 29th June, 1855, in her first pregnancy. She could not tell how near she was to her confinement, nor the date of her last menstruation. Her legs were considerably swollen. About the middle of July, she complained of very poor appetite, and felt very weak. On examination the legs were found very œdematous, pulse small and weak, respiration much interfered with. Bowels costive, urine scanty. Liver, kidneys, lungs, and heart, apparently healthy. On the 26th July, an attack of syncope came on. Abdomen, now enormously distended, hard, tense, and painful. Occasional vomiting. She had not felt child for four weeks. On the 6th August, she could not keep the horizontal posture. Dyspnœa very great; countenance very anxious; restless. Dr. Barber having determined to puncture the membranes, perforations were made. In her endeavour to walk from the bed to the chair, the patient was seized with so great dyspnœa, that she became almost delirious. Soon after she fainted, and died, evidently suffocated.

Autopsy.—Thorax: all organs healthy. Aorta unusually small; not being over an inch in diameter. The uterus occupied the *entire cavity* of abdomen, pushing up the diaphragm. The intestines were pushed far up to either side, filling the smallest possible space. All the organs healthy. The uterus and its entire contents weighed 22¼ lbs.: the fœtus weighed 8¼ lbs.; the uterus and placenta 4¼ lbs.; the amniotic fluid 9¾ lbs., or very nearly *five quarts*. Slight dropsy of the cord. No evidences of inflammation in any of the parts.

[It is to be regretted that the condition of the placenta was not minutely examined.—REP.]

8. Dr. Von Siebold relates a case of spontaneous expulsion of the placenta before the child. A woman, aged twenty-eight, six months pregnant, felt pains on the 6th of July, 1853. Hæmorrhage occurred with labour-pains on the 8th. When seen by Dr. Varenhorst, at seven P.M., the pains were strong, but the bleed-

ing was less. The os uteri was the size of a dollar; the placenta was presenting. Forty-five minutes after this, the placenta was expelled; and immediately afterwards the child appeared, in foot presentation, and was delivered. The child gave no sign of life. There is no mention of hæmorrhage after the expulsion of the placenta.

9. Dr. Trask has collected all the published cases of placenta prævia which he could find in the leading medical journals, and in the pages of standard authors; adding some cases not published. This collection is both more numerous and better classified than any other yet published. He especially avoids the error of Dr. Simpson, pointed out by the Reporter, of fusing the cases of spontaneous and of artificial detachment of the placenta. The cases are arranged under three heads. Table I. consists of cases subjected to the various ordinary modes of treatment, embracing recoveries and deaths, and a few cases that died undelivered. Table II. embraces cases of spontaneous expulsion of the placenta prior to the birth of the child. Table III. includes cases in which the placenta was artificially detached before the birth of the child.

[The Reporter would observe, that the analysis of the individual cases given in the tables is so full and well-arranged, as to exhibit the leading particulars of a vast number of cases in a form very compact and easy for reference and study.]

Table I. embraces 251 cases. Of these, 200 were cases of turning; 141 recovered; 59 died, or 1 in $3\frac{4}{10}$ths. There were 50 cases of spontaneous delivery; 43 recovered; 7 died, or 1 in $7\frac{1}{7}$th.

Among the *recoveries* after *spontaneous expulsion* of the child, there are 20 cases of *partial* presentation of the placenta, and 10 cases of *complete* presentation. Of the *fatal* cases after *artificial delivery*, there were 12 cases *partial*, 45 *complete*.

Among the *recoveries of the mother*, in which the fate of the child is noted, in 46 cases the child was *living*, and in 61 it was *dead*. Among the *deaths* of the mother, in 10 the child was *living*, and in 23 *dead*.

Table II. contains 36 cases. Among these cases of spontaneous expulsion of the placenta, in 29 in which the result is mentioned, there are but 2 *deaths*, one eight days, one twelve days after delivery, both from diarrhœa. We are struck at once by the fact that in these cases the womb acted with much more vigour than in cases of this accident in general. In 9 the pains are spoken of as *strong*; in 5 others the pains are expressly spoken of; and in most others it is evident that active labour existed.

Of the 36 cases, 16 were delivered by spontaneous expulsion, 1 apparently in the same manner, 3 assisted by traction on foot, 9 mode not stated, 7 by turning. Of these last 7, 3 were *arm*-presentations. After the separation and expulsion of the placenta, hæmorrhage for the most part ceased. Of 22 cases in which the degree of subsequent bleeding is noted, it ceased in 14, in 4 it continued very slight.

Table III. contains 66 cases, all that have been published, in which the placenta was separated by the hand. This table gives 47 *recoveries* and 13 *deaths*, or 1 death in $4\frac{6}{10}$ths as the gross mortality in artificial separation; whilst in spontaneous separation it is only about 1 in 14, a comparison that clearly demonstrates how unsafe it is to deduce the rule of total artificial detachment from the results of spontaneous detachment. Dr. Trask says, the gross mortality after artificial separation is therefore somewhat less than the general mortality under ordinary modes of treatment, and especially less than after turning; but it is very much greater than after spontaneous expulsion of the placenta.

Of the cases in this table, it is noted that in 35 cases the presentation was complete. This gives a considerably larger proportion of complete presentations among those in which artificial separation was resorted to, than in those included in Table I. The child was delivered in 22 by natural powers, in 3 by craniotomy, in 1 by forceps, in 2 extracted, in 33 by turning, in 1 by vectis, 1 undelivered, in 3 not stated: that is, 1 in 3 was delivered by spontaneous expulsion of the

child. It is a remarkable fact, not adverted to by the author, that 33 cases, or exactly one-half, required *turning* in addition to the artificial detachment of the placenta, although the avoidance of this operation is a main argument advanced in favour of the practice.

As to hæmorrhage after detachment of the placenta.—In 35 it ceased *immediately* and *entirely;* in 1 no further hæmorrhage is spoken of; in 1 none for several hours, then slight; in 2 ceased "almost instantly;" in 4 ceased "entirely;" in 1 case not a teacupful lost afterwards; in 1 not over two ounces lost; in 3 it continued slight; in 1 continued at intervals; in 1 it was "not increased;" in 1 "no further danger;" in 1 it abated, but ceased only after cold water; in 1 it continued a good deal; in 7 immediate delivery followed; in 4 cases, not stated.

Conditions for which detachment of the placenta was resorted to.—In 31 cases there was *extreme* exhaustion. Of these, 23 recovered, 8 died. Of the 8 fatal cases, 1 died in half an hour, 1 in a short time, 1 in a few hours, 1 in twenty-six hours, 1 on the eighth day, 1 in one week from fever, in 2 the period of death is not stated. In 11 cases there was *rigidity of the os uteri,* in 9 the patient recovered.

Disposition of the placenta.—In 36 cases the placenta was simply detached, in 30 it was withdrawn at once. Of the 35 cases in which hæmorrhage ceased at once and entirely, it was separated only in 20 cases, and separated and withdrawn in 15 cases. Hence it would appear that the mere separation of the placenta is sufficient to arrest the hæmorrhage.

Mortality of children after artificial detachment.—Fifteen children are reported saved, 32 as lost, in 16 the result is not stated, in 2 it was not viable, 1 was undelivered. We should probably not err in adding to the number lost the 16 in which the result is not stated. This would give 48 deaths out of 63, or 15 saved out of 63, a mortality of about 75 per cent. Now, Dr. Trask states the mortality of children after ordinary modes of delivery to be nearly 25 per cent, or 75 per cent. saved, against 25 per cent. lost. And if we subtract from the number said to be saved after artificial detachment, the 2 cases to be referred to presently, in which it is more than doubtful whether the entire placenta was detached, we have only 13 saved, instead of 15, out of 63, as calculated by Dr. Trask, giving a mortality of 80 per cent. of the children when the placenta is wholly detached before the delivery of the child. This success is, however, greater than was anticipated, and one which instigates an inquiry into the conditions under which children may be born alive after the detachment of the placenta. It is found that among the children saved, delivery took place in 6 immediately, in 3 apparently immediately, in 1 immediately in part, in 1 after dilating the os and turning, in 1 in less than 10 minutes, in 1 in half an hour, in 1 in 5 hours, in 1 not stated. That a child should live five hours after the total separation of the placenta seems improbable, and it turns out that this case, taken from Perfect, is one in which it is not proved that the separation was complete.

The case in which the child was born alive after a lapse of half an hour rests on the authority of Dr. Bland, and is recorded in 'The Missouri Medical Journal,' 1847. On analysis, however, it appears that in this case also the placenta was *not withdrawn,* and that in all probability the separation was not complete. It results, that we have no case recorded in which the child was saved unless it was delivered immediately, or in less than ten minutes, after the detachment of the placenta.

10, 11, 12. The subject discussed in the several memoirs on placenta prævia relates to a point in the physiology and pathology of placenta prævia not until recently noticed by obstetric authors. As the papers in which the abstract of Dr. Barnes appeared are accessible to our readers, we must refer them to those journals. Dr. Barnes' views and pathological applications have recently been the subject of warm controversy in Germany.

Dr. Credé's and Professor Hohl's papers are merely controversial and critical.

III. Puerperal State and Lactation.

1. *On the Contagiousness of Puerperal Fever.* By Dr. Credé. (Verhandl. der Ges. für Geb., 1855.)
2. *Secretion of Milk excited by Nursing in a Grandmother.* By J. Boring, M.D. (Atlanta Medical Journal, Oct. 1855.)

1. The report of Dr. Credé on Puerperal Fever is confirmatory of the conclusions arrived at in Vienna, as to the contagiousness of that disease. He relates that for nearly two years puerperal fever had raged with but little intermission in the Charité Hospital in Berlin. He refers to a statistical account by Dr. Quincke, to show that of about 650 women delivered there in the last year, 139 had been removed for illness to the inner station; all of these, with the exception of 15, were affected by puerperal fever, and 68 died. All the apartments used for the labour patients were twice changed, and once every utensil and all the attendants were changed. All had little or no influence. In the new rooms, as in the old, puerperal fever continued. Upon this the physicians of the outer station made the observation that the contagion of hospital-gangrene and of pyæmia, which also had not ceased within that time, was in close relationship with the puerperal fever contagion. It was therefore weighed by the committee whether it would not be desirable to remove the lying-in institution altogether from the Charité. Dr. Credé added, that it appeared manifest that wherever hospitals were connected with lying-in wards, puerperal fever contagion assumed far greater development and intensity, as in Vienna, Prague, Stuttgard.

2. Dr. Boring's case is of physiological and medico-legal interest. Mrs. J., aged about forty-seven, was married at twenty-three; had borne three children, and suffered one abortion. She nursed her last child thirteen years since, and until recently has not secreted a vestige of milk. In April last, her married daughter died a few days after childbirth, leaving the child to her mother (Mrs. J.), who to soothe it at night applied it to the breast. An abundant secretion of milk was the consequence.

BOOKS RECEIVED FOR REVIEW.

Chimie appliquée à la Physiologie et à la Thérapeutique. Par le Docteur Mialhe. Paris, 1856.

A Catechism of Chemical Philosophy. By John Horsley. London, 1856.

Automatic Mechanism, as applied in the Construction of Artificial Limbs. By Frederick Gray. London, 1855.

First Step in Chemistry. By Robert Galloway, F.C.S. Second Edition. London, 1856.

Too-hasty Generalisation a hindrance to the Progress of Medicine as a Science. By C. J. Hare, M.D. London, 1855.

The Anatomy, Physiology, and Morbid Anatomy of the Stomach and Intestine. By W. Brinton, M.D. (From 'The Cyclopædia of Anatomy.') London, 1855.

Common Sense *versus* Homœopathy. By Samuel Knaggs, M.R.C.S. London, 1855.

On Personal and Domestic Hygiène. By Lionel J. Beale. London, 1855.

Report on the Cholera Outbreak in the Parish of St. James, Westminster, during the Autumn of 1854. London, 1855.

Du Cancroïde ou Cancer Epithéliale. Par Jean Nicolas Dupuy. Paris, 1855.

The Indian Annals of Medical Science. October, 1855.

De la Rue's Medical Memorandum-book and Indelible Diary. 1856.

Ueber die Aufnahme des Quecksilbers in den Kreislauf. Von C. E. E. Hoffmann. Würzburg, 1854.

Ueber das Pathologische Verhalten der Kleineren Hirngefässe. Von Hermann Mosherr. Würzburg, 1854.

Trois Observations de Tumeurs Epithéliales. Par M. Virchow. (From 'Gazette Médicale,' 1855.)

Norsk Magazin for Lægevidenskaben. ix Bind., 5—11 Hefte.

Hooper's Physician's Vade-Mecum. Fifth Edition. By W. A. Guy, M.B. London, 1856.

Aids during Labour. By J. R. Pretty, M.D. London, 1856.

Beiträge zur Kenntniss des Menschlichen Stoffwechsels. Von Gustav Gross. Giessen, 1855.

"Difficulties of Homœopathy." A Letter by John Anderson, M.R.C.S. London, 1856.

General Board of Health. Instructional Minute.

Geschichte der Forschungen über den Geburts-mechanismus. Von Dr. K. Stammler und Dr. G. Knoes. Fortgesetzt von Dr. M. Fresenius. Giessen, 1855. Dritte Abtheilung.

The Half-yearly Abstract of the Medical Sciences. Edited by W. H. Ranking, M.D., and C. B. Radcliffe, M.D. July to December, 1855. London, 1856.

The Assurance Magazine, January, 1856.

The Retrospect of Medicine. Edited by W. Braithwaite. July to December, 1855. London, 1855.

Statistics of Placenta Prævia. By James Trask, M.D. Reprint. Philadelphia, 1855.

On the Chemical Analysis of the Tennessee Collection of Urinary Calculi. By E. B. Haskins, M.D. Clarksville, 1855.

Introductory Address on the Inauguration of the Military Surgery Chair. By Jolliffe Tuffnell, F.R.C.S.I., &c. Dublin, 1855.

A Practical Treatise on Diseases of the Testis and of the Spermatic Cord and Scrotum. By T. B. Curling, F.R.S. London, 1856.

Dental Anæsthesia. By J. R. Quinton. 1856.

On Excision of the Knee-Joint. By R. G. H. Butcher. (Reprint.) Dublin, 1855.

On Excision of the Elbow and Wrist Joints. By R. G. Butcher. Dublin, 1855.

On Unsoundness of Mind in its Medical and Legal Considerations. By J. W. Hume Williams, M.D. London, 1856.

Sul Coléra Epidemico dellà commonità di Poggibonsi nel 1855. Del Dott. Pietro Burresi. Firenze, 1855.

Microscopic Examination of the Tubercles of Molluscum. By Lionel J. Beale, M.B. (Reprint.) London, 1855.

Copies of Correspondence in the Case of the Medical Officer lately dismissed by Sealed Order from the Cork Dispensary. Cork, 1855.

Remarks on Insolatio, or Heat Apoplexy; with Observations on its Pathology. By M. G. Hill. (Reprint.) Calcutta, 1855.

Die Geographischen Verhältnisse der Krankheiten. Von A. Mühry, M.D. Leipzig, 1856.

The Sanitary Condition of Paddington. By Graily Hewitt, M.D. London, 1856.

Headaches, their Causes and their Cure. By Henry G. Wright, M.D. London, 1856.

Die Krankheiten des Auges für Praktische Aerzte. Von Dr. Ferd. Arlt. Band III. Hälfte 1. Prag, 1855.

Lehrbuch der Physiologie des Menschen. Von Dr. C. Ludwig. Zweiter Band, Zweite Abth. Leipzig, 1856.

Statistics of Grave-yards in Scotland. By John Webster, M.D.

Taubstummheit, Ohr und Gehör Krankheiten. Von Friedrich Ludwig Meissner. Erster Band. Leipzig, 1856.

Geschichte der Forschungen über den Geburts-mechanismus. Von Gustav Brück. Giessen, 1855.

The Micrographic Dictionary. By J. W. Griffith, M.D., and Arthur Henfrey, F.R.S. Parts XVI. and XVII. London, 1856. (Conclusion.)

Ocular Spectres and Structures. By James Jago, A.B., M.B.

Trees, and their Nature; or, the Bud and its Attributes. By A. Harvey, M.D. London, 1856.

Hints to Husbands. By One of the Guild. A Revelation. London, 1856.

Cretins and Cretinism. By George S. Blackie, M.D. Edinburgh, 1855.

Memorie della Società Medico-Chirurgica di Bologna. Vol. V. Fasciculi IV. Bologna, 1855.

Recherches Expérimentales. Par le Dr. Brown-Séquard. Paris, 1855.

Propriétés et Fonctions de la Moëlle Epinière. Rapport sur quelques expériences de Brown-Séquard, par M. Paul Brocas. Paris, 1855.

Sur les Résultats de la Section du nerf Grand Sympathique au Cou. Par le Dr. Brown-Séquard. (Reprint.)

Experimental Researches applied to Physiology and Pathology. By Brown-Séquard. New York, 1843.

Experimental and Clinical Researches. By Brown-Séquard, M.D. Richmond, 1855.

On Cystic Entozoa in the Human Kidney. By T. Herbert Barker, M.D. London, 1856.

Specielle Heilmittellehre. Von Dr. W. J. A. Werber. Band II. Abth. II. Hälfte 2. Erlangen, 1856.

Handbook of the Movement Cure. By M. Roth, M.D. London, 1856.

A Practical Treatise on Vesicular Hydatids of the Uterus. By W. H. Ashley, M.D. London, 1856.

On the Advancement of Midwifery Education in Scotland. By T. M. Duncan, M.D. Edinburgh, 1856.

Transactions of the American Medical Association. Vol. VIII. Philadelphia, 1855.

The Correspondence relating to the 'Lancet' Sanitary Commission. Examined by J. C. Durnford, Esq.; J. A. Power, L.M.; Raymond S. Daniell, M.A. London, 1856.

Medical and Middle-Class Education. An Address delivered at the Chatham-street School of Medicine. By Sir J. K. Shuttleworth, Bart. Manchester, 1856.

Muscular Contraction a Physical Phenomenon. By C. B. Radcliffe, M.D. London, 1856.

Obscure Nervous Diseases popularly explained. By J. L. Levison. London, 1856.

American Journal of Insanity. January, 1856.

INDEX TO VOL. XVII.

OF THE

BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW.

END OF VOL. XVII.

THE

BRITISH AND FOREIGN

MEDICO-CHIRURGICAL

REVIEW

OR

QUARTERLY JOURNAL

OF

PRACTICAL MEDICINE AND SURGERY.

VOL. XVII.

JANUARY—APRIL, 1856.

LONDON:

JOHN CHURCHILL, NEW BURLINGTON STREET.

MDCCCLVI.

LONDON:
SAVILL AND EDWARDS, PRINTERS, CHANDOS STREET,
COVENT GARDEN.

CHAPTER IX.

In general, after convalescence from yellow fever, the recovery to perfect health is rapid and thorough. I have notes, however, of five seamen who before discharge from hospital suffered from paroxysms of intermittent fever, in the months of July and August, 1852. In the Colonial branch, at various times, parties discharged cured of yellow fever have returned within from ten to fifty days, suffering from the endemic intermittent. These were chiefly Portuguese immigrants, who are very prone to this disease at all seasons, and during non-epidemic periods. These sequelæ, however, were more common in the months of July and August than in other months. I have a note of only one case in private practice (that of Mrs. M.), where intermittent fever appeared clearly as a sequel of yellow fever. Bloody furuncles, as before noticed, are so close on the primary affection, and so obviously one of its morbid processes, and so frequently co-existent with black vomit (in the case of Mr. L. M., a white native, who died on the third day of illness with black vomit, a malignant-looking furuncle appeared on the upper lip), that it is doubtful if it should be rated as a sequela only. But they frequently appear during apparent convalescence, and of course retard it, and become associated with abscess and ulcers, which readily heal. The parotid gland suppurated in four cases of Portuguese, as the result of a bloody furuncle in each; and in one sailor, Devine (Seaman's Hospital, 17th of November, 1852), there was one instance of a bubo over Poupart's ligament as a sequela. In convalescence, also, small boils frequently appear over the face and other parts of the body, but it is difficult to ascertain whether these should be referred to the previous disease or the irritation which follows the application of vesicatories, and is observed so often as their effect when applied in other affections. Gangrene of the prepuce occurred in the case of Ernest Home (Seaman's Hospital), who was suffering from gonorrhœa before and during the attack of yellow fever. Anasarca of face, hands, and feet, without desquamation of cuticle, while the skin was still yellow, appeared in the case of Grammage (Seaman's Hospital, 2nd of October, 1852). In the case of Mr. Mackinnon, of the *Jane Brown*, urticaria came on while the skin was still very yellow, accompanied with abdominal pains. Then a recession of the rash took place, and dementia (preceded by oscillatory movements of the eyes), quadruple vision, and death. Oozing from the gums was frequent in convalescence from the "smouldering" forms of the disease. Retention of urine occurred in the case of Anderson (the Swede). One seaman was readmitted to hospital on account of debility, after his attack. Where the attack had been severe and profound, wasting of the body was sometimes found to have taken place, as (markedly) in the case of the master of the brig *Speculation*, who had had black vomit before recovery; and Peter Daly, Major, and Anderson, before referred to. When veneesction had been used in treatment (as in the case of Havish, Seaman's Hospital, 16th of January, 1853), convalescence was much protracted. Bright's disease was a sequel in the instance already mentioned. The patient, Manuel D'Alvia was admitted to the Colonial Hospital on the 5th of April, 1853,

with a violent attack of the epidemic, from which he recovered. He was discharged on the 16th of July, at his own urgent request, with his urine still albuminous. He had been cupped for the sequela over the kidneys: had issues then applied: had taken a long course of gallic acid, but without benefit. His ailment somewhat emaciated and anæmiated him, and gave to his countenance an expression of gravity; yet there was no œdema or dropsy, and his appetite was tolerably good. As he felt well, he could not understand why he should remain in hospital. The most singular sequela of yellow fever, if it be really one, was that in the case of Miss G., a subject of one of the anomalous cases of black vomit before referred to. I saw her in consultation about five months subsequent to the period when I had seen her in the primary affection. She suffered from a compound of anæsthesia, pain, and atrophy of the left hand and fore-arm. It began about two months before with numbness, and afterwards with some peculiar occasional pains; but no physical alteration was noticed, and she was supposed to be fanciful. Since then, the symptoms have much increased, with both numbness and tenderness on friction, chiefly along the course of the ulnar nerve. The fore-arm is much wasted, but the startling atrophy is in the fingers. Motion is perfect; there is no breach of surface; but the fingers have an attenuated ivory appearance. She has not been using her left arm, or but rarely, for some time, even before she began to complain. But the wasting is not muscular only. It seems as if all the tissues, and even bones, had wasted symmetrically. She had never been quite well since the black vomit, and has had several attacks of intermittent since then, and since the commencement of the present affection. Chalybeates and galvanism were recommended, and change of climate, which being adopted, the case has been lost sight of, and the result unknown. Two cases of abscess of the liver followed as sequela of yellow fever; one in a Portuguese man, Josia Joachim, admitted to Colonial Hospital, 24th of February, and discharged 28th of May, 1852. In this case the liver was twice opened, and an enormous discharge of purulent matter let out. The other case was in a negro girl, Lucy, a native of Barbadoes, once punctured, and cured. Inflammation, acute pain, and swelling of the joints occur sometimes in convalescence, when the action of the poison has been profound; but though often threatening suppuration, these painful swellings have always terminated by resolution. One of the most common sequelæ is jaundice, and this greatly retards the period of perfect recovery. Most of the cases that remain long in hospital after convalescence, and of which period no report is made in the case books, have been detained by this affection. It is a true sequela, and not to be confounded with the lemon tinge and orange eye which are present in the advanced stages of the disease. As has already been noticed, in this sequela the eye is smooth and unvascular, and the skin yellow or tawny, the urine is copious, and loaded with bile, and the fæces are formed, grey, and abilious. The one state seems the result of *excitement* of the liver, and the other of *obstruction* of the bile-ducts. One of the most uncommon ailments of females, colica pictonum, attacked Mrs. B. in early convalescence from an attack of the prevailing disease, which had proceeded to the stage of acid elimination, on exposure to the atmosphere of a lately painted room.

Relapses were of frequent occurrence, occasioned most likely, in great measure, by a return of the patient to the focus of infection after discharge from the hospital. These relapses were almost exclusively among the aborted cases. They frequently recurred, and were aborted several times. The primary attack was generally without albuminosity of urine, and frequently the relapse also, as in the captain of the *Undine* (private practice), and Thomas Wright (Seaman's Hospital, 17th of June, 1852), &c. &c. But in the relapse there was often an accumulated power in the disease, and albuminous urine was expected, even if the disease were again aborted, during convalescence. Relapses, however, occur in which, and in the primary attack, the urine was albuminous, as with R. Fuyakerly (Seaman's Hospital, 25th of July, 1852), &c., in whom the relapse was easiest of abortion; and in George Maccy (Seaman's Hospital, 12th of February, 1853), and Peter Francis (Seaman's Hospital, 5th of March, 1853), in whom the relapse was fatal. These, however, were comparatively rare, and we have had only two relapses after the disease had run on to black vomit—viz., those of Anderson (Seaman's Hospital, 16th of February, 1853), and Adam Smith (Seaman's Hospital, 31st of December, 1852), both of which were readily aborted, although the last-mentioned relapse proceeded to albuminous urine. Duncan Livingston (Seaman's Hospital, 3rd of August, 1852) sustained a relapse or second attack. His first was on the previous 12th of July; and though on that occasion his urine was far from albuminous, the eye was tinged. Daniel Clarke (Seaman's Hospital, 29th of June, 1852), was then in hospital for a relapse, and stated that he was very ill ten or eleven years ago, in Demerara, with yellow fever. On the 23rd of August, 1852, the steward of the *Maria* was admitted to hospital with an attack of the prevailing epidemic, which was aborted by two doses. He stated, that four years ago he was very ill at Vera Cruz with yellow fever, and suffered afterwards at the same place with intermittent fever. Relapses were more numerous than appear in the case books, when they occurred in hospital. Such were promptly and extemporaneously prescribed for; and if they were aborted by the first dose, as they frequently were, no report was made of them. The tendency to relapse or second attack was generally within the first month after the primary attack. Master J. B., and Mr. M. C. (of the house of Irvine and Sons) had each a second attack exactly one year after the first, both recovering. The primary attack in the former having been severe, and the second mild, exactly the reverse of what happened with the last-named patient. A case of yellow fever, alternating with intermittent, and ending fatally, occurred in the Colonial Hospital. Manuel de Frytas, only three months in the colony, had several attacks of intermittent, one of which was on the 27th of October, 1852, but on the 10th of November following he was admitted for an attack of yellow fever, which proceeded on to albuminous urine and scrotal excoriations. He was discharged on the 28th of November, cured. On the 7th of December he was re-admitted for intermittent fever, and cured; and on the 4th of January following he was again admitted with yellow fever, urine highly albuminous on that day, and he died suddenly on the 6th of January. There was no post-mortem examination. Relapses, then, were frequent after aborted attacks, but very rare after the disease ran to its

second stage, whether it stopped with the first stage of acid elimination or proceeded to black vomit.

When the epidemic has terminated, and the harvest of facts are gathered to their granary, then, by the application of the *numerical method* to this and other branches of the subject, the vague terms "frequent," and "seldom," may be dropped, and the ratio of frequency of the several symptoms can be stated with precision. The present estimates are rather qualitative than quantitative.

CHAPTER X.

The mode of death in uncomplicated yellow fever has four distinct varieties, and these are sometimes blended—viz., syncope, uræmia, apoplexy, and asphyxia. When the black vomit is plentiful or the urine free, the intelligence remains clear and unclouded; but the skin becomes cold and damp; the pulse small, and, finally, extinct at the wrist, and the patient dies of gradual exhaustion and syncope. Lamont (Seaman's Hospital, 5th of December, 1852) died apparently from rapid collapse, following excessive discharges of black vomit. The description of the mode of death by uræmia has already been in great measure anticipated in the foregoing chapters. If before death the urine be suppressed, and the black vomit is not copious, or has ceased, the circulation becomes contaminated; and when this condition operates on the brain in its mildest form, the effect is not unlike alcoholic inebriation; as in the case of the master of the *Hindu*, who, on the night of his death, sat up in bed, drank beverages, and joked with the ship-masters around him; and the carpenter of the *Eleanor*, who, within a few hours of his death, and while pulseless, I found, on my visit, sitting up in his chair, and regaling himself with his tobacco-pipe. If all the excretions and secretions be locked up, as occasionally happens (the master of the *Honor*, for instance), the symptoms of uræmic poisoning become violent, the sensorium painfully affected, irritability of temper, screams and wild ravings, coma and convulsions, ensue. Death from syncope does not arise from excessive discharges of black vomit alone. It is often the result of hæmorrhage, as in the case of the uncontrollable epistaxis in W. Smith (Seaman's Hospital, 25th of March, 1852); or bleeding from the mouth and gums, as in the case of Ferguson (Seaman's Hospital, 2nd of November, 1852). Frequently these two causes—i.e., black vomit and hæmorrhage—combine in inducing this mode of death, as in the case of Mrs. W. The following extract note, written on the day of her death, illustrates this point:

"Before black vomit appeared, the catamenia came on prematurely, the bowels became spontaneously relaxed; and last night there was much flatulent purging of blood, and a considerable hæmorrhage from vagina. After a cessation of twenty hours, black vomit again returned to-day. After total suppression for twenty-four hours, four ounces of alkaline urine was drawn off by catheter. On my visit at daylight this morning, she was quiet, and apparently suffering no pain, and rather apathetic. The marked change which I found in her case, was a deterioration of the pulse in volume. The nervous symptoms of the preceding day, which threatened inebriation or convulsions, had disappeared. The pulse became gradually weaker, until about eleven A.M., when it could not be felt. She was aware of her hopeless condition, and tranquilly disposed of her trinkets to her friends and

relations. As she approached her end, the breathing became quicker and shorter, until it ceased in a few little gasps at long intervals. About half an hour before she died, she apparently lost her vision, then her hearing, and sensation, first of the mouth and nose, and then of the arm, in quick succession, and in the order stated. It was an appalling scene, to see her lying silently on her back, and trying to *rub back* vision and hearing and feeling, with her hands. She spoke not a word during the time; but it was evident that the senses were all being blotted out one by one while consciousness yet remained. Before death, at two P.M., one or two slight convulsive jerks of the shoulders were the last respiratory efforts.—17th of February, 1853."

After death in this case, a large quantity of black vomit escaped from the mouth in turning the body. The mode of death by apoplexy, caused by congestion, and effusion and extravasation of blood on the brain, is instanced in the Seaman's Hospital cases of R. Williams (3rd of March, 1852), Peter M'Guire (13th of November, 1852), and Peter Thomas (17th of December, 1852). The following Seaman's Hospital cases furnish instances of death by asphyxia:—Moses Dillon (25th of July, 1852); laryngeal suffocation; the Portuguese sailor (31st of August, 1852), and Milligan (14th of December, 1852), from pulmonary apoplexy. Cases sometimes terminate suddenly, as if by *explosion*. Thus, Peter Scott (Seaman's Hospital) was doing well. On the 1st of November, 1852, at noon, he suddenly became ill, vomited black vomit, and died within a few hours, with alkaline breath. Patterson, who died on the 18th of February, 1853, had his stomach perfectly quiet till within a few hours of his death, when he suddenly disengaged immense quantities of black vomit. His urine had been tolerably free up to a short time previously. Alexander Stewart, who died on the 14th of February, 1853, in Seaman's Hospital, is another instance. He became suddenly ill at four P.M., on his fifth day, and died at six P.M.

The causes that disturb the current course of the morbid phenomena have not yet been satisfactorily investigated. They may be due, perhaps, to sudden formation of some poisonous compound in the blood, or the hæmorrhagic yielding of the bloodvessels. Some modes of death may be purely accidental: thus Juan de Susa died from rupture of the spleen, caused by jumping out of the window while delirious. The essential modes of death are modified by those inflammatory complications to which yellow fever is so liable in its course. Thus, M'Kechnie (Seaman's Hospital, 30th of January, 1853) became delirious from evidently neither uræmia nor hyperæmia, but sympathetic suffering arising from pericarditis. Milne's (Seaman's Hospital, 28th of February, 1853) symptoms were modified by an atrophied heart. Devine (Seaman's Hospital, 17th of November, 1852) died with gangrenous lymphatitis; and Savage (17th of November, 1852) died from the shock and pain of acute lymphatitis. The hospital case books are perhaps more deficient in illustration of the mode of death, than of any other of the phenomena of yellow fever. If the death did not occur about the hour at which the reports were written, the final symptoms were seldom described, as, except in extraordinary cases, a single daily report only was made. This arose from the inadequacy of the staff of resident surgeons—the reporters—for the wants of the epidemic period.

There are no sufficient materials to authorize an estimate of the natural

mortality of the present epidemic. Many untreated cases were brought into both hospitals, as the case from the *Rowley* (Seaman's Hospital, 8th of August, 1852), or Francosco Pisthano (Colonial Hospital, 7th of May, 1853), presenting all the well-marked characteristics of the disease; and were, I believe, uniformly fatal. But those untreated cases which recovered, if any, would not of course present themselves at the hospital; hence no comparison can be instituted. It would be a most desirable consummation to ascertain the law of mortality of this disease, as a base line by which results of treatment might be compared; and if some honest homœopath, careful in his diagnosis, would tabulate the results of his practice, he would confer an immense benefit on the science of medicine, by determining the true ratio of mortality of untreated cases. I am in possession of only two well-authenticated narratives which can throw any light on this subject, and they refer to the mortality occurring on board of two vessels after their departure from our harbour. The note which records the case of the brig *Atalanta*, I herewith copy in full, although it contains matters not strictly relevant to this branch of the subject.

"This vessel arrived on the 1st of July. She took up her moorings off 'Holmes Stilling,' nearly in the same place where she lay in January (her last voyage), and in which she was perfectly healthy. Her crew consisted of eight hands and the master; total, nine. On the 19th, two men sickened, and were sent to the Seaman's Hospital. Both cases were very violent, and one died. On the 21st, the vessel sailed up the Demerara river, to take in a cargo of wood at Berlyn, about seventy miles up from town. While proceeding up the river on the evening of the 21st, the second mate sickened. He had refused his supper the evening before. The captain gave him 10 × 12 grains of calomel and quinine, and repeated the dose in three hours, and afterwards gave him castor oil; after which he perfectly recovered, and subsequently was left alone in the vessel to take charge of her. On the 23rd, the first mate and the steward and a boy sickened, and the captain repeated on them his former prescription; but the dose was instantly vomited, and not again repeated. On the 26th, the captain finding that the men were still ill, sent them carefully down to town, in the long boat, to be sent to the hospital or to sick lodgings. They did not reach town till the morning of the 28th, before which all three had died with black vomit. On the 27th, the captain fell sick, and one man, but were quickly pulled down to town in the small boat, and arrived before the long boat, and they went to sick lodgings. After this, the last remaining unaffected man sickened, and was brought to town, and died on the 1st of August. The importance, I conceive, of this instance, is in affording some information relative to the value of treatment, and the probable mortality of untreated cases. They were all gravior cases. The three men who got each the dose which was instantly rejected, may be considered as untreated cases, and all died. Of the two admitted to the hospital, one, or fifty per cent., died. Of the four treated in private lodgings, on the same plan of therapeutics as is pursued in the hospital, one died—the last arrival. The captain states that his former crew had been trading here for three years previously; but that the present crew had not before been in the tropics. This, however, I think will not account for the exemption in the first instance, and the excessive malignity in the present. The lines of infection often shift, and the malaria occasionally operates in vortices, for sometimes one vessel will be suffering from fearful sickness and mortality, while another in the neighbourhood, perhaps not two cables' length off, is exempt. The case of the *Atalanta* contrasts strongly with that of the *Camillus*. In February last, the last-named vessel lost five of six of her crew. The sickness commenced on her tenth lay day. She returned here from London in the latter end of June,

took up her station in the same place (furthest tier out in the river, opposite Johnston and Bros Stelling), and on the *same lay day* the yellow fever again broke out. I advised her being unmoored immediately, and anchored further up the river, which was done, and she has suffered much less this voyage. The *Camillus* seemed to lie in the wind-line of *permanent* infection, blowing from off the Blissingen sluice and the slaughter-house. The unfortunate *Bilair* and the *Honor* lay in the same line.—7th August, 1852."

The brig *Sarah*, of North America, after remaining a few days in harbour, proceeded on to Surinam. She left our port towards the end of July, and after rather a tedious voyage, arrived in Surinam early in August, where she was put in quarantine, and taken in charge of the American consul, till he could send to the United States for a crew—the *captain and all the white crew having died* on the passage from Demerara. This intelligence reached Demerara on the 9th of August, and was published in the local newspapers. The vessel had been piloted from Demerara by a Mr. de Vivre, who on his return gave me information substantially the same as that published. The following is my note of it, made at the time:

"To-day, met Captain de Vivre, who returned from Surinam ten days ago, leaving the *Sarah* still there, under the charge of the American consul. The *Sarah* left this port on Friday evening, with nine of a crew—viz., the master and two mates (*white*), a light-coloured man, three negroes, all natives of North America, and two negroes, natives of Hayti, or St. Domingo. There were also three passengers, two of them females, belonging to Demerara, and a gentleman of Surinam; also Captain de Vivre, who acted as pilot (white creole of St. Eustatia; family several generations in the West Indies, and he many years resident in Demerara), and a negro (?) boy, whom he took with him. One of the crew, a St. Domingian, had been to the Seaman's Hospital for some trifling ailment. *All the crew fell sick the same night* on which they sailed hence. The master, two mates, and light-coloured man died on the following Friday, all within eight hours of each other; all with black vomit, but the master with convulsions. The three North American negroes seemed at one time very ill, but recovered, with the St. Domingians. Nobody else was in the slightest degree affected.—6th October, 1852."

The impression is general throughout the colony that the present epidemic is much more intense than was the preceding; and this opinion is countenanced by the fact that several fatal cases have occurred among the white creole population. As far, however, as documentary evidence goes on the subject, a parallel cannot yet be drawn between the past and the present epidemics; for on the former occasion, eighteen months elapsed before the Seaman's Hospital was established, and trustworthy and extensive records kept; and as the beginning of an epidemic is generally its most virulent period, a comparison with the present is not yet admissible. The following table of thirteen months' admissions and deaths is given, with the explanation, that in the public hospitals of Demerara and Essequibo, in both its main departments, no patient, however ill, is refused admission, *if alive* when the conveyance is sent for him, or when brought to the hospital: that in the colonial department many cases are admitted moribund; that in the selection of cases, when the hospitals are crowded, the preference is always given to the gravior case; and that the hospitals are very frequently made the receptacle of the hopeless cases of private practice.

RETURN

Showing the Number of Admissions, Discharges, and Deaths of Yellow Fever in the Colonial and Seaman's Hospitals, from December 1st, 1851, to January 31st, 1853.

	1851. Dec. Admitted.	Died.	Cured.	Remaining.	1852. Jan. Admitted.	Died.	Cured.	Remaining.	1852. Feb. Admitted.	Died.	Cured.	Remaining.	1852. March. Admitted.	Died.	Cured.	Remaining.
Europeans (residents)	...		...		..	..	...	..	3	2	1	..		..		.
Madeirians	3	1	2	.	65	26	18	21	111	36	55	44	134	56	60	62
Creoles and Barbadians (coloured)		...	...	.	3	...	2	1	1		1	1	1	1	1	.
Aborigines	.	...	..	.	..	..	...	.		.			...	.		.
East Indians (Coolies)	.	...	..	..	3	...		3	3	1	3	2	7	1	3	5
Seamen of shipping	20	2	18	...	86	13	47	26	93	27	64	28	54	12	40	30

	1852. April. Admitted.	Died.	Cured.	Remaining.	1852. May. Admitted.	Died.	Cured.	Remaining.	1852. June. Admitted.	Died.	Cured.	Remaining.	1852. July. Admitted.	Died.	Cured.	Remaining.
Europeans (residents)	1			1	...	..		1	1	.	1	1	1	.	1	1
Madeirians	71	37	40	56	63	26	42	51	51	15	23	64	31	8	32	55
Creoles and Barbadians (coloured)			.	..	2		2	..	2	..	1	1	5	1	2	3
Aborigines	...	.		.	.		..		...			..	..			.
East Indians (Coolies)	4	2	1	6	6	2	7	3	5	.	2	6	5	1	5	5
Seamen of shipping	69	17	41	41	76	24	60	33	94	24	49	54	90	26	65	53

	1852. Aug. Admitted.	Died.	Cured.	Remaining.	1852. Sept. Admitted.	Died.	Cured.	Remaining.	1852. Oct. Admitted.	Died.	Cured.	Remaining.	1852. Nov. Admitted.	Died.	Cured.	Remaining.
Europeans (residents)	...	...	...	1	...	...	.	1	.	...	...	1	1	...	1	1
Madeirians	33	9	24	55	16	2	13	56	7	1	7	55	20	..	22	53
Creoles and Barbadians (coloured)	2	..	4	1	...	...	.	1	1	...	...	2	...	..	1	1
Aborigines	.	.	.	..	...	...	...	.	...	.	...	...	...	.	...	...
East Indians (Coolies)	4	1	6	2	4	1	..	5	1	..	2	4	..	...	1	3
Seamen of shipping	88	18	65	58	55	17	57	39	93	19	60	53	110	32	65	66

	1852. Dec. Admitted.	Died.	Cured.	Remaining.	1853. Jan. Admitted.	Died.	Cured.	Remaining.
Europeans (residents)	.	...	...	1	...	...	...	1
Madeirians	18	8	49	14	72	21	40	25
Creoles and Barbadians (coloured)	...	...	...	1	...	...	1	...
Aborigines	...	...	...	..	...	..	...	...
East Indians (Coolies)	...	...	..	3	...	...	3	.
Seamen of shipping	128	49	99	46	186	48	139	45

TOTAL.

	Admitted.	Died.	Cured.	Remaining.
Europeans (residents)	7	2	5	—
Madeirians	698	246	427	25
Creoles and Barbadians (coloured)	17	2	15	—
Aborigines	—	—	—	—
East Indians (Coolies)	42	11	31	—
Seamen of the Shipping	1242	328	869	45

CHAPTER XI.

The first general anatomical fact in reference to the disease under consideration, is the almost universal *bloodiness* of the tissues of the body in a patient who has died from yellow fever, having been previously healthy, and not dying from actual hæmorrhage. *Hyperæmia* does not express correctly the idea of this condition, for the dissection of the body shows not only too much blood, but also blood in the wrong place. It flows out from the sub-cutaneous areolar tissue; the mesentery is loaded with it; the areolar tissue forming the attachments of the windpipe and gullet is bloody; so is the mediastinum and the fat around the kidneys. The intestines appear, externally slate-coloured, or gangrenous-looking through the peritoneum, from congestions and extravasations in the mucous and sub-mucous coat. The pleura costalis participates in the same sanguineous appearance as the connecting tissue of the throat, from the universal hyperæmia and extravasation beneath that membrane. If we look into the trachea, and bronchi, and œsophagus, stomach and intestines, and coverings of the brain, and lining of the bladder, we find a similar condition in some, and it may be in all these surfaces. If we wash away the mucus or blood which obscures the view, we may find the part highly sanguineo-vascular, the capillaries in a state of distension, without breach of continuity; if in the stomach, leashes of them may be seen torn and disorganized; or the part may show structureless unvascular ecchymosis, and dots or wavy lines, or patches of greater or less extent, or splashes, as if red ink had been projected from a pen. The membrane of the stomach shows the most varied hyperæmia; sometimes it is arborescent, as if the arterial twigs were chiefly affected by engorgement. Sometimes it occupies the rugæ and villi in wavy lines; in other cases it is in rude hexagonals, as if the capillaries surrounding the mucous follicles were alone affected. At other times, the predominating appearance is an universal rosiness, or deep claret or purple, as if the sub-mucous tissue had been infiltrated with pigment; but generally, most of these varieties of hyperæmia are blended together. If we examine the parenchyma of the great viscera, a similar condition of *bloodiness* obtains. The kidneys are sometimes ecchymosed below the capsule, and a section of them is *always bloody.* The liver is very frequently in the same condition, and is sometimes enlarged from general engorgement, and softened and friable in spots, as if from broken-down structure. The lungs are often apoplectic, with the interlobular spaces broken and infiltrated, so as to lose all physical appearance of pulmonary tissue, and resemble huge clots of blood. These conditions are generally found in the most dependent parts, but frequently the upper and front part of the lungs and liver, and pelvis of the kidneys, are so affected. The appearance is therefore clearly not hypostatic, although gravitation must exercise some localizing power. Sometimes one viscus may be engorged, and a neighbouring one anæmiated and dry. This relation sometimes exists between the kidneys and liver, as in the cases of Gibney and Morgan (Seaman's Hospital, 21st of September, 1852); hæmorrhage during the disease, and previous anæmia, have a similar modifying effect.

The next general anatomical characteristic is the altered condition of the mucous membranes. In the mouth, œsophagus, stomach, and intestines, it has suffered some serious alteration. The epithelium is peeled off, generally or partially, or the whole depth of the membrane is softened, as if acted on by an alkali, or is eroded through to the sub-mucous coat.

These are the two general facts common to all normal cases, and obvious to any careful observer. Inflammatory diseases seem congenial to the action of the yellow-fever poison; and during the progress of the disease, we have frequently found them supervening as epiphenomena. We have also seen yellow fever apparently excited into action by their presence, and consequently the traces of these accidental complications will occasionally be found in the post-mortem examinations. But the lesions of yellow fever seem to have little or nothing in common with those of simple inflammation, and the only *quasi*-inflammatory condition which seemed a result of the disease was, in some instances, where the capsule of the liver—such as in the case of Ellwood (Seaman's Hospital, 21st of February, 1853)—was red and vascular, and, as if in incipient inflammation, excited apparently by the mechanical distension of the engorged parenchyma. It is likely that the suppurations of the liver, which have occurred as sequelæ of yellow fever, were occasioned by the disorganization of tissue which follows the congestions and ecchymoses before referred to; and that, had Macey lived, he would have suffered from an abscess in the softened part of the liver, as the only mode of reparation which nature could institute.

In the post-mortem notes which follow in the reports of some of the fatal cases, the terms "blood congested" and "bile congested" have been used, and require some explanation. The first term is obvious enough, and means what it says—engorgement with blood; but the latter does not always mean engorgement with bile: it has reference more to colour than any other quality; and when the liver was yellow, of whatever shade, the term "bile congested" was applied to it, in contradistinction to the dark purple or slate colour which indicated hyperæmia. Now, this yellow condition of the *enlarged* liver is not yet satisfactorily understood. It is no doubt true that the liver is found sometimes dry and anæmic, from having been drained by hæmorrhage, or vital or physical determination to some neighbouring viscus; and then the capsule of Glisson, tinged by the bile, communicates the ochre or straw or cream-colour to the whole mass. But where enlargement also is present, with or without anæmia, the explanation is not sufficient. Of what does this yellow or ochre enlargement consist? This point has not yet received sufficient attention. But I have found that, in these cases, a small portion of the parenchyma scraped off and submitted to the microscope, showed an abundance of oil globules. In cases which have terminated fatally after protracted illness or apparent convalescence, the bloody condition of the kidneys has passed away, and the cortex is hypertrophied, and of a dull ochrey colour. This condition seems clearly due to the impaction of the tortuous tubuli uriniferi with the same epithelial and fibrinous (?) matter which constitutes the sediment of the urine; and the presence of this matter and fragments of tube-casts can be demonstrated by the microscope to constitute a part of this yellow hypertrophy. But I have never been able to detect oil globules in the

kidney; and the instance narrated in the post-mortem notes is undoubtedly a fallacy of observation, the oil most likely having been derived from the blade of the knife. The congestion of the kidneys during life seems to have been attended with no irritation; it is signalized only by albuminosity of the urine. With one exception, nothing like diuresis was observed, nor could have taken place without being noticed, till convalescence became established. Neither was there pain in the congested organ but once or twice (Juan de Nolriga, 24th of December, 1852). The pain so often complained of in the loins is lumbar, and in many of the best-marked cases, careful pressure failed in detecting tenderness of the kidneys. The lesion of the lungs was seldom, if ever, attended by cough or pain or râle, or any sign to attract the attention of the patient or physician until the blood extravasation demanded expectoration. On the liver there seemed to have been induced an irritant effect. The suppression of bile in the last stage had always been preceded by an erethism of that organ, as indicated by the copious secretion of bile, independent (as in the case of the master of the *Ursuline*), although no doubt increased by the action, of the resolvent dose; and there was frequently tenderness of the epigastrium towards the right side early in the disease, and before it could be occasioned by, as it no doubt frequently is in the last stages, the distension of the capsule: the kidneys and lungs, therefore, seemed to suffer passively, while the liver suffered from active congestion. There was not always a perfect correspondence between the lesion of the kidneys and their functional disturbance during life. Occasionally I have noticed the kidneys in an almost apoplectic state, and yet their functions were scarcely interrupted; and, on the other hand, I have been disappointed in the amount of congestion in instances of entire suppression. In the former case, perhaps, the engorgement occupied less the secreting than the ductal tissue; but this point requires much more investigation. In the post-mortem notes, the weight of the several viscera is given. This precision would have been enhanced had the total weight of the body in each case been also given. Still the weights assist in forming an estimate of the condition; but weight does not in all cases represent the proportional degree of congestion:—thus, in Maxwell's case (Seaman's Hospital, 12th of March, 1853), the kidneys seem to have been naturally small; and although their weight was not extraordinary, yet the engorgement was so intense that their shape became altered to globularity. About one hundred dissections were made since the beginning of the epidemic; but the notes of the first series became confused, and are rejected; and several examinations were made of which no record was kept.

CHAPTER XII.

The common, or *gastro-hepatico-renal, form of yellow fever*, with its stage of febrile reaction and unhealthy subsidence, may be protracted far beyond the average duration of fatal cases; as in the case of Milne (Seaman's Hospital, 24th of February, 1853), or the mate of the *Sobraon*, already referred to. These prolongations of life will generally be found associated with free action of the kidneys, although the urine be albuminous. On the other hand, as in the case of Philips (Seaman's Hos-

pital), who had black vomit within forty-eight hours; and Mr. Dod, who on the second day had, with copious bilious vomitings, *bile in the blood, albuminous urine, and black vomit*, the disease, by the intensity of the epidemic cause, and the high susceptibility of all parts of the body, may be hurried on to early and rapid maturity. In the preceding chapters, *choleroid* and *diarrhœal varieties* have been already mentioned. These refer to the modes of accession, and point to varieties in which the tongue and eye symptoms are generally less early and less distinctly marked, and in which early excoriations around the *anus* occur. In these, the intestinal variety, the *cæcum* is found in a condition similar to that of the stomach; and the lower end of the ileum corresponds with the condition of the upper end of the duodenum in normal cases. In fact, in such cases the cæcum removed from the body might be readily mistaken for a yellow fever stomach. About the beginning of February, 1852, the intestinal variety, or modification of this all-pervading disease, was very common. As has just been stated, in these cases the capillary irritation of the tongue, eye, and face, are generally less observable. In attacks on *old residents*, also, and the black and mixed races—negroes, coolies, and mulattoes—these symptoms are also less characteristic; and the redness of the tongue shows itself at first in the fungiform papillæ only. In the case of the master of the *Hindu*, there were scarcely any *primary gastric symptoms*, and the disease seemed at once concentrated on the kidneys. When the nervous centres seem early affected, and the disease is complicated with *alcoholismus*, the cutaneous system also shows little erethism, and the surface is sometimes even pale. On the 21st of November, 1852, W. Greig died in the Seaman's Hospital, without having manifested the external erethism. On the 27th of July, a case, in which *alcoholismus* was not suspected, occurred, with pale cutaneous surface, in Norman (Seaman's Hospital), and which terminated suddenly and unexpectedly with jet-black black vomit. Williams's (Seaman's Hospital, the 23rd of June, 1853) was a similar case, in which were nervous tremors, but in which intemperance was denied. With *anæmics*, as might be expected, and among Portuguese immigrants, the surface symptoms were less striking than among natives of northern climates. In the latter, the disease sometimes assumed a scarlatinoid form; as in the case of Thomas Fry (Seaman's Hospital, 19th of May, 1852), whose fauces were rough, with red vascularity; and Thomas Dawson (Seaman's Hospital, 10th of February, 1852), who, in addition, had ulcerated sore throat. Exceptions, however, appeared, and the most intense action on the capillaries of the skin, as before related, was seen in the Portuguese man, Antonio Fernandez. In the cases of Copeland and James Foster (Seaman's Hospital, 8th of March, 1853), the eyes were as red and injected as in the most violent ophthalmia, but without photophobia or lachrymation. Pericarditis, as a complication, seems to obliterate the surface symptoms, and gives a pale, collapsed, exsanguine expression, as in the cases of Mr. Kichner and Moses Cain (Seaman's Hospital). In the *pulmonary form* of the disease there was no difference in the external symptoms from those commonly observed. But unusual heat of the chest sometimes gave early notice of this obscure variety; and uneasiness, jactitation, and heavy breathing, indicated its approach to pulmonary

apoplexy. Auscultation and percussion have not yet been sufficiently applied in the exploration of this condition, and chiefly from the restlessness and impatience of the subject of it. The *cerebral variety*—that which arises from hyperæmia (and not uræmia)—is characterized sometimes by intense pain in the head and disordered mind in the early stages of the disease; and, as in the case of Laird (Seaman's Hospital, 16th of October, 1852), uncontrollable irritability of stomach. In the late stages, typhomania sometimes occurs from congestion and effusion on the brain, as in the case of John Williams (Seaman's Hospital, 1st of September, 1852), and in whom, as usual, no lesion of the intestinal glands could be discovered. There is some difficulty in discriminating between the effects of uræmia and hyperæmia on the brain, as both conditions are seldom pure. Thus, in Laird's case the one followed the other, and was mixed with it. But the typhomania of Mr. Williams was readily distinguishable, by the assistance of collateral symptoms, from the occasional delirium and insensibility of such a case as that of Charles Maxwell (Seaman's Hospital, 10th of March, 1853), who, suffering from uræmic intoxication, sat up in bed, and amused himself in scolding the nurse and every person around him. Yellow fever, as has been observed already, occasionally came into collision with small-pox; and the latter prevailed, and excluded the former, if in the incommutal stages. It was found *mixed* up, both as a primary or secondary affection, with the following diseases:—Pneumonia (single and double), pleuritis, pleuro-pneumonia, pericarditis, meningitis, lymphatitis, delirium tremens, and intermittent fever. Of all its admixtures, the most numerous, it would appear, were those with pneumonia. But there was likely a fallacy on several occasions in regard to this complication. The expectoration from a softened and broken-down lung was, no doubt, frequently mistaken for the rusty expectoration of inflammatory hepatization. It was in the cases complicated with *delirium tremens* that the peculiarity in the conditions of coagulability of the urine was observed. Mr. C., an Irish youth, about six months in the colony, had been threatened with delirium tremens fourteen days before the attack of yellow fever. On the third day of attack the epidemic disease left him, but the delirium tremens then recurred with its most marked characters, and he died two days afterwards. The Ursuline Convent is situated in perhaps the most miasmatic locality of the town. One of the nuns who died of black vomit had three distinct paroxysms of tertian intermittent, the last ending with the fatal attack of yellow fever. As all our patients in the Seaman's Hospital came from the shipping, the focus of infection, it was to be expected that outbreaks of the epidemic disease would occur among patients who had been admitted thence for other ailments. These did happen frequently, and gave rise to a modification of attack, which we have denominated "threatenings." An extract from my note-book of some notices of this form will show what is meant by the term.

"*Threatenings of Yellow Fever.*—We have frequently seen such in the Seaman's Hospital—men admitted with other ailments, and requiring 20 + 24* as intercurrent treatment. Two such cases occurred to-day and yesterday, in the persons of Griffith Thomas and Charles Burton, well marked, and subdued by the dose. These

* For explanation, see page 81.

cases are prescribed for *pro re natá*, and seldom entered in the case-books. Sometimes these threatenings finally break out into fatal attacks."—10th August, 1852.

"*Threatenings and Outbreaks in Seaman's Hospital.*—John Hooper, admitted with phthisis, ending in severe attack. Frederick Taylor, gonorrhœa, ending in severe attack; two doses required. Walker, gonorrhœa and stricture—fatal. Duncan Cameron, fractured clavicle—one dose. William Cransick, second threatening. William Roberts, threatening."—15th, 19th, 22nd, 24th August, 1852.

"These threatenings are generally marked by flushed face, frontal headache, with considerable warmth of forehead, suffused eyes, and quickened pulse. If not stopped (but they generally are) by one resolvent dose, they are highly dangerous. They frequently occur and are prescribed for *en passant*, but when aborted are not noticed in any of our records. The incubation of some of these attacks seemed retarded in the presence in the system of such evacuant diseases as phthisis and gonorrhœa."—25th August, 1852.

"*Threatenings of Relapse.*—Three cases occurred yesterday in Seaman's Hospital in convalescents from yellow fever, all extinguished by one dose each."—13th September, 1852.

"*Attack while in the Hospital with crushed fingers, repulsed*, twice within a few days, by four powders, in case of Mate Anderson."—Seaman's Hospital, 27th December, 1852.

"*Two Threatenings of Yellow Fever*, one coming with chills, among those some time in (Clinch and Freeman), aborted by one dose each. This happened yesterday; close, warm, humid weather, followed by torrents of rain to-day."—18th May, 1853.

There was a form of the epidemic disease which was known in our case books by the name of "smouldering." This type is distinguished by the absence of any rampant symptom. It seems to be a *non-localized* variety, or so equally but mildly spread over the system that no organ is intolerably implicated. This variety *begins* in much the same manner as the common form; but if the attack be not aborted, it proceeds differently. Its peculiarities begin from about the second day. In its mildest degree, the disease then seems to have nearly departed, but the patient remains languid. The skin, which is nearly cool, becomes purplish over the face, arms, and chest chiefly (languid capillary circulation, as it is called in the case books). The eye gets tinged, the urine is free but bilious, and, for a day or two, albuminous. But gradual restoration to health follows. In severer cases these symptoms are all intensified, but still the kidneys are not much involved; the stomach remains quiet; there is little capillary irritation of the mucous membranes visible, and little or no peeling of the epithelial covering of the tongue. But the skin has a macerated, greasy appearance, and beads of acid perspiration stand on the forehead, on the alæ of the nose, and around the mouth, and sudamina appear over the body. Around the anus and over the lower surface of the scrotum, the cuticle peels off; and if any blister has been applied, the surface there is of a claret colour. The blood is alkaline, and the matter of the excoriation also. A small bloody anthrax appears (in the case I have now in view—the mate of the *Alexander Johnston*, private lodgings) on the left elbow. The patient throughout has been and remains taciturn and apathetic, and speaks in a subdued, low tone of voice. This brings his case to the end of the third day. Incipient black vomit may appear, as it did in the mate's case on the fifth day. Convalescence then begins, but is slow. The junction of the gums and teeth oozes blood, which stains the fur of the tongue, as if with tobacco-juice; but the appetite is good; the skin clears between

the interstices of the sudamina; these little vesicles dry up and desquamate; the powerful action of the kidneys soon relieves the circulation of bile and decolours the eye, and health is perfectly restored. Few good descriptive cases of this form of the disease are to be found in the case-books, owing to the circumstance that there are so few salient points to be described, and little indication for any interference with nature on the part of the physician. Such cases, in the hospital reports, break off, generally at the second or third entry, with such a prescription as the following:—℞. Aq. acet. ammon., aq. camphorat., āā. ℥ss. ter in die; and no report is again made until eight or ten days after, when he is marked discharged; the medicine in the meantime having been omitted, probably after two or three days' use. Of such cases were England (Seaman's Hospital, 19th of July, 1852), Lamont, Dixon, Pullin, Jenkins, Russell, Gorman, Forsyth, and W. Davies (Seaman's Hospital, December, 1852). The pathological rationale of this variety of yellow fever is yet to be cleared up; but it would seem as if the less vital structures were the throne of the disease in such cases; that it occupied chiefly the periphery of the body—the cutaneous capillaries instead of those of the central viscera. I am also inclined to believe that, though diarrhœa has not been found to usher in the attack, it is sometimes the manifestation of the *intestinal* variety, or in alliance with it.

Akin to this form of the disease is another. It was noticed in the last epidemic. It appears most frequently among the dark races, and some of the Madeirians. It is, perhaps, a mere extension of the *smouldering* form, but the symptoms are more typhoid. It has strong resemblances to sea scurvy, if we could conceive that to be an acute disease, and hence may be named the *scorbutic variety*. It is generally unattended with gastric symptoms, nausea, or vomiting; and instead of the raw-beefy, clean, epithelium-denuded tongue of normal cases, the mouth seems as if smeared with tar. The following note, which I made in my memorandum-book for another object—viz., to illustrate the *formative* stage of yellow fever—will describe the scorbutic variety in an European—not pure, certainly, but sufficiently characteristic. Although this case was eminently suggestive of other important matters, the phenomena at the time were not duly appreciated nor correctly interpreted, and it was regarded only as illustrative of the mode of invasion of yellow fever.

"*Formative Stage of Yellow Fever, showing itself by Boils on Forehead.*—Captain Sutherland, of the brig *Hero*, Shetlander, a very tall, narrow-chested, and very old-looking man (although it is stated that he is only forty-five years of age), got yellow fever, in the invasion stage, on the night of the 18th instant. I had seen him every day for a week previously, while I was attending his mate for an attack of the gravior form of the epidemic. For five or six days before the invasion his forehead was covered with little numerous unhealthy boils, which prevented him from being able to wear his hat. As will be seen by the sequel, this was evidently the first manifestation of a peculiar case of yellow fever, closely allied to scurvy. The febrile symptoms were low all along while they lasted (two days). While under them, he walked along a plank ashore to meet me (the brig lay alongside the wharf, and the mate, who recovered afterwards, lay sick in an adjoining house), to save me the trouble of going on board. He was with difficulty persuaded to lie up. When the short, trifling fever left him, his pulse fell much in power (particularly observed in right radial artery, probably from a natural difference of size in the artery), and became very slow—forty-eight. The chief symptom, and which persisted, was a

crimson-tipped tongue, wedge-shaped, and the surface behind tip foul and brown, and inclined to dryness. His gums began to bleed and recede from the teeth. He hawked up rusty sputa from mouth and fauces. His restlessness was easily, and *much too easily*, quieted by a few drops of morphine solution. In fact, this is the first case of the present epidemic in which morphine was detrimental. The boils on the forehead began to fade and become purplish. Other and larger boils, with an unhealthy dark-purple centre and apex, and coppery inflamed areola, came out over arm, body, and legs; and some bullæ, which burst and bled dark grumous blood. Anorexia; extreme faintness and nausea on assuming the erect position ensued. Stomach easily irritated by the swallowing of food and drink, but never decided vomiting. Feebleness of voice; urine copious and dark-coloured. Bowels inclined to torpidity, but easily acted on. To-day, two of the boils on right leg bled much; so much, that I was called to arrest the hæmorrhage. They looked livid and much swollen from a large black clot, which I tried to remove without using much force, but could not. I think it had the appearance which is described as 'bullock's liver' in sea scurvy. A little stream of red blood trickled out from the clots, which lead me to suspect that a small artery had given way. Hanging down the leg or attempting to stand made the hæmorrhage, which otherwise oozed, alarming. He to-day also complained of much *pain in the side* (the dangerous sign in sea scurvy, described by Lind) below the right axilla, midway in side; and from an imperfectly-made auscultation with the ear, dulness of respiration was found over seat of pain, and an occasional coarse crepitus. He now also *expectorated* rusty tenacious mucus. A dry cup was applied over the seat of pain, with some relief. Notwithstanding the most liberal and varied use of cordials, and soups, and anti-scorbutics, he sunk during the day, rapidly, and when I last saw him—about half-past 7 P.M. to-day—he was restless and moaning, and almost pulseless, and unable to ascribe his uneasiness to any local pain. No vomiting or nausea. His breath and body have been exhaling a disagreeable, sour (?), fetid smell all day. I do not expect to find him alive to-morrow, 25th of February, 1852.

"I may mention that, in the foregoing case, I examined his legs to-day, to detect that hardness of the muscles which authors say is found in the legs of those who suffer from sea scurvy. But the muscles and integuments were quite flaccid. He never had been on a very long sea voyage, nor suffered at any time from sea scurvy, and has been in this harbour nearly three months. Does the foregoing case not seem to show that, in yellow fever, the blood is primarily affected? 25th of February, 1852.

"Captain Sutherland died at midnight; his urine was free; he continued moaning, but his intelligence was clear." 26th of February, 1852.

By Peter Daley's case, before referred to, the notion that hæmorrhages of yellow fever have their origin in a dissolved state of the blood, was staggered, and a lesion of the solids looked to, with probability, as at least a joint cause. This modification of opinion was for some time unsettled, and the dubious and unsatisfactory phrase of "loss of vital cohesion," all the explanation applicable to the condition of the arterial tubes which the mind had to lean on. The case of Captain Sutherland is now much more intelligible than at the time when the foregoing notes were written. It was clearly a combination of the scorbutic and pulmonary forms of yellow fever. But so far do I now consider it from proving that the disease is primarily a blood affection, that I feel convinced that the scorbutic variety arises from the yellow fever poison acting chiefly on the *arterial twigs* and capillaries. If this view be correct, it might be well for those who have the opportunity, to re-examine the current pathological opinions on sea scurvy.

It will have been perceived, that the distinctions of variety and form in yellow fever are to a considerable extent artificial; that one variety is seldom seen pure; that they are generally mixed and blended. Still, the distinctions are not without differences, and they assist in understanding the malady in its Protean shapes. The *simplex form* of the last epidemic was not observed in the present, in the coasts and low lands. Neither was it observed in the last till the epidemic had continued upwards of two years.

CHAPTER XIII.

On the subject of diagnosis and prognosis much has been necessarily anticipated in the foregoing observations. I know of no disease with which a well-developed case of yellow fever could be confounded; and to those who understand its habits it can rarely present any serious difficulty of diagnosis in any of its stages and complications. In the early stage alone can a mistake be made. The absence, then, of some of the external symptoms should induce the practitioner to extend his inquiries, and he will rarely find a case in which the capillary irritation is not observable on some part of the exposed mucous surfaces. Should such an instance occur, he will find the fever accompanied by that peculiar form of headache which is decisively diagnostic. This headache gave the earliest warning, and in Surinam and Cayenne was relied on as the most characteristic symptom. Should the capillary irritation not appear after the lapse of forty-eight hours, then he must look out for those complications which have been already indicated—the chief of which is pericarditis. I could conceive much embarrassment on the part of the practitioner in distinguishing yellow fever from benign scarlatina, if the two should happen to co-exist as epidemics; and I am quite unprepared, at present, to assign any satisfactory differential distinction. But when the stage of acid elimination has been marked, all doubt must then be at an end, for this phenomenon is unknown in any other fever. I have seen instances in which yellow fever was stupidly mistaken for ophthalmia, and the disease treated accordingly; but not in the present epidemic has such a blunder come to my knowledge. With the mind of the practitioner alert to the existence of the epidemic constitution, he can, by intelligible signs, recognise even the taint which is communicated to other maladies, and identify the disease, with moral certainty, amidst any of its complications.

On the 3rd of January, 1853, Manuel d'Alrea presented himself for admission to the Colonial Hospital among the crowd of other applicants, and complained only of pain in his side, cough, and fever. On applying the ear to the affected part, pleuro-pneumonia was readily discovered. But on observing afterwards, the state of his tongue, the presence of yellow fever was at once recognised. On further examination of the urine, the same day, it was found highly albuminous, and the existence of the double disease was confirmed by the sequel.

On the 29th of June, 1852, an exactly similar case had occurred in Vincent Gomes, in which pleuro-pneumonia was the primary disease, and fatal yellow fever consecutive, but detected in its onset, and through the disguises of the leading affection, by the tongue symptom.

I have had no opportunity since it became important to ascertain the

fact, of testing the urine in that intensified form of marsh or malarial fever commonly known as *bilious remittent*, and locally with us, *colony fever*, and cannot say if albumen be present or not in any stage of it. But numerous observations have failed in detecting it in the base or radical of that disease, intermittent fever: and the capillary irritation and acid elimination during life, and the altered condition of the mucous membrane of the alimentary canal after death, are, I believe, never found in bilious remittent. In this latter affection the mode of death, with us, is generally by coma, and the sub-arachnoid effusion and opaque arachnoid membrane explain the *rationale* of it. In it the spleen and liver may be enlarged, but the kidneys are unaffected; and, save the jaundiced tinge, the traces of diseased action, such as in yellow fever, are not seen. When vomiting occurs, it is when the congestive stage has reached its acme at the termination of the chill, and, except in drunkards, rarely extends into the hot stage. Engorgement of the liver and spleen and portal circulation, and not irritation of the mucous membrane of the stomach, seem to originate the vomiting, and be relieved by the copious discharges of the bile that follow. The headache is in the temples or top of the head, or all over it. The stomach, instead of becoming more irritable, is settled as the disease advances, and large draughts of fluid are easily retained. Calomel and antimonial powders, in small and frequently repeated doses, act soothingly. The teeth and tongue are dry, but not red and vascular, and the epithelium apparently worn off at the tip, as if by attrition with the teeth. But the epithelium in reality is only *shrivelled*, and when the remission occurs, the tongue is flat, moist, and pale, and its epithelium is found entire.

Yellow fever, although it may be engrafted on an intermittent, when once formed has no intermissions. It is a fever of one paroxysm, without the crisis of perspiration; and when it is over, health is restored, or the disease goes on inducing its ultimate changes without febrile action. The time of seizure is different with yellow fever from that of our permanently endemic fevers. It generally comes on in the night half of the twenty-four hours; while with us, all our miasmatic fevers, whether quotidian, double quotidian, or tertian, in the immense majority of instances, occur at mid-day. And, if we follow intermittent into its sequelæ, we find no resemblance between the two diseases. There is not the quick restoration of health usual in yellow fever, nor the bloody furuncles of unhealthy convalescence; but instead, enlarged spleen, anæmia, dropsy, and colliquative dysentery.

Although frontal as well as general headache, with lumbar and other muscular pains, usher in the fever of small-pox, the absence of gastric irritation and capillary injection of tongue, lips, and eye, is sufficiently distinctive.

The number of the characteristic symptoms present, and the degree in which they are manifested, furnish criteria of the severity of the case, and the ratio of danger. A slow pulse and moderate temperature of the body and quiet stomach are always favourable indications. But the more fiery crimson the tip and edge of the tongue, the more irritable the stomach, the severer the headache, the worse the prognosis of the first stage, and *vice versâ*. Slight or moderate epistaxis is a sign of little

prognostic value in any stage; but a streak of blood in the early vomit indicates much danger from the attack; while the same during the stage of black vomit, or after acid elimination has set in, is favourable, if the corpuscles are found entire. In the second stage, the earlier or more complete the suppression of urine and the more copious the ejections of black vomit, the more imminent the danger. But if the urinary secretion continue, and the black vomit be scanty from the first, or is afterwards suppressed, the patient may yet survive. Urine simply albuminous is a less serious sign than when it also contains tube casts; but if these are thin and few in number, they do not add much to the gravity of the indication. Free, copious urine, no matter how dark or bilious, is the most favourable of any single sign. If the urine be scanty, and it be loaded with tube casts, entangled in epithelial and fibrinous (?) matter, the light buff-coloured curdy sediment before mentioned, it indicates a complex lesion of the secreting structure of the kidney. It is the urine symptom in its maximum of severity, and is as fatal as if the suppression had already occurred. Blood corpuscles in the urine were not looked on with apprehension. A faltering of the articulation is a bad prognostic, and a difficulty of protruding the tongue enhances it. Prognostics are derived from the effects of treatment. If the resolvent dose do not bring away "stools characteristic of the powder," but, instead, thin grey abilious matter; or if early hypercinchonism be induced, it is an unfavourable indication. The danger of the case is enhanced by inflammatory complications, and by hypertrophy of the heart. The recency of residence in a temperate climate; the *race* or complexion of the individual; the fact of his previously having suffered from a gravior attack, or an aborted one, will enter into an estimate of his chances of recovery. It is unnecessary to recapitulate the modes of death. These are signs too late to be of any practical importance.

CHAPTER XIV.

Till the 6th of January, 1852, the profession and the public were unaware of the presence of yellow fever in the community. The fatal cases in the family of Mr. Vervestein had not been recognised by the practitioner in attendance (who had never before seen the disease), and nothing was said of them till after the disclosures from the hospitals had been made to the local government. Dr. Gavin, the Medical Inspector for the West Indies, then in the colony, learned the fact from the government secretary's office. This circumstance is mentioned to demonstrate the difficulty of discovering *first cases* in any epidemic, unless where the opportunities of observation are as ample as the vigilance is unceasing. The manner in which the epidemic invasion commenced in the shipping, is described in the official communication to Governor Barkly, of the foregoing date, how it began by tainting the ordinary endemic fevers, and gradually acquiring intensity, till the disease became a well-developed primary affection. This communication and the appended documents, as well as a statement of the health and meteorology of the non-epidemic period, have already appeared in the third edition of the "Account of the Last Yellow Fever Epidemic of British Guiana." The particulars in regard to the two fatal cases therein referred to, as the earliest in private

practice, and occurring about the 22nd of December previously, are as follows:—Mr. Vervestein, an Englishman by birth, thirty-two years old, twenty-eight of which he resided in Barbadoes, took up his residence in Georgetown, Demerara, about two years prior to the outbreak of the epidemic. His domicile was in Carmichael-street, opposite the south-west end of the parade ground, and close to, and directly to leeward of, what was then a very wide, putrid, offensive trench. Mrs. Vervestein and three children rejoined Mr. Vervestein from Barbadoes, exactly three months before the first case of sickness appeared in the family. The children, on arrival in the colony, were remarkably plump, ruddy, and clear in complexion, as if they had arrived from England, instead of the West India Islands. The first case was in the person of his son, five years old, who recovered. Then, and while his brother was sick, a younger son, three years old, sickened and died. Then the father sickened, but recovered. And lastly, the infant, eighteen months old, sickened and died. The two deaths occurred within a week. The mother remained quite healthy. Mr. Vervestein informed me that his father died in Barbadoes, after residing there several years, of yellow fever, at the age of sixty-three. This family had no connexion with any source of human contagion; and the cases which immediately followed them, and the cases which occurred at several intervals of time in the same street—viz., the governor's white maid-servant, Mrs. S., Mrs. B. H., and Mrs. H.'s white maid-servant, had no communication with each other; and except in the Vervestein family, each case occurred in a single form, and without any lateral offshoots.

From the statements already given of the progress of the epidemic from east to west along the coast of South America, it has in this instance every appearance of having been an *imported disease*, though not in the sense usual to that term. The condition of the coast line, which had been observed as coincident with former epidemics, was in this instance absent. The epidemic outbreak also recurred in a much shorter cycle than we had reason to expect from past experience; and however much it might be domiciled, and sustained, and reproduced (for though the pestilence extended on to leeward, it at the same time remained with us), a comprehensive view of its whole march enforces the conviction, that in this instance the prime exciting cause had its origin beyond the bounds of the colony.

It would appear from the observation of the present epidemic that though, as is well established, a certain high average temperature is required for the generation and continued existence of the efficient cause of yellow fever, it has not its genesis from any known combination of meteorological elements, and may appear at a time when they are highly favourable to general health and comfort: that the laws of its diffusion differ from those of gases: that it is impelled by atmospheric currents, but seems to possess some power of spontaneous motion: that though intense energy of vegetative power characterized the seasons antecedent to and during the epidemic invasion, its shifting lines of infection and gyratory movements suggest to the imagination the attributes of insect life: that the development of its power was gradual, from its feeble and diluted manifestation at the end of October till its perfectedness at the

end of December, and its maximum of intensity a month afterwards: that during the course of its progress it showed marked variations of epidemic power: that in constitutions apparently the same, the system was affected in various degrees, as if the poison acted in proportion to its quantity, and as a poison and not a ferment: that its first impression on the system seemed in many cases local and circumscribed, although attended with the usual constitutional disturbance: that it can actively occupy the body simultaneously with other affections, and may be either subordinate or paramount in the issue: that though its extensive application or saturation of the system by the efficient cause eventuates in a spontaneous outbreak of the disease in the individual, there are circumstances which accelerate its action and augment its intensity, and others which retard or entirely obviate and render it inert. These circumstances will now be considered, and though little that is new can be added to the subject of aggravating, exciting, determining, and predisposing causes, and the conditions of comparative immunity, the fresh illustrations may be useful in corroborating former experience.

As to the effects of personal *contact*, mediate or immediate, with those sick of the disease, the case of the brig *Sarah* has been already noticed, in which all the crew sickened simultaneously, and all those of the white or mixed race died within a week. The following is the newspaper article which then appeared, and the statements of which were subsequently confirmed. The italicising of some of the words is mine:—

"*Paramaraibo*, 3rd Aug., 1852.—Last week arrived at Braams Point the North American brig *Sarah*, Captain L. S. Griffin, from Demerara, which, in consequence of the sickness on board, was put into quarantine. His Excellency the Governor immediately ordered the health-officer on board, for the purpose of treating the sick. According to the reports sent in by the doctor to yesterday's date, we learn the death of the captain, first mate, second mate, and one sailor; but fortunately the others had all recovered. We understand that the passengers, *who remained throughout healthy*, will in a few days be allowed to come to town."

Mrs. Vervestein, who must have been in the most intimate contact with the infant who died in her family, alone escaped an attack. In the book of the Colonial Hospital, it is mentioned in the last epidemic that a Maltese woman, named Fannia, died of yellow fever on the 16th of January, 1840, and while she had black vomit, nursed her infant at the breast, without communicating disease to it. The brig *St. Fillan* lost three men in Demerara with yellow fever in the present epidemic, after which she proceeded to Berbice to take in cargo. Immediately after her arrival there, two of her men and the mate sickened and died. They had obviously contracted the disease in our port, and transplanted it to the neighbouring country. But it did not grow. No steps were taken to prevent the spread of contagion, if any existed, but the importation was without issue.

We had two specimens of the West India Island type of the disease imported into Demerara while our epidemic was in progress. Mr. C. T. Chandler and his brother arrived on the evening of Tuesday, the 28th of October, to take shipping for England on their way to Australia; the age of the former was about twenty-two; he was a white, a native of Barbadoes, and had never before been out of that island. He had sickened with yellow

fever that there then prevailed, on his passage over. I saw him on Thursday evening for the first time; the brother not alarmed, supposing his illness to have been only sea sickness and its effects. He died with black vomit, on Saturday morning. I watched the influence which this case might have on the health of the inmates of the house in which he died till the 11th of December following, but no effect could be observed.

Mr. B., a passenger from England by the mail steamer, at the end of December, 1852, contracted yellow fever while the steamer lay at some of the infected islands—probably Barbadoes. It was four days old when he arrived in Demerara. A bloody furuncle formed on his cheek during convalescence. No injurious effect followed either to the inmates of the house or his friends, who had the most unrestricted communication with him.

The *Lancaster*, *Atalanta*, and *Flirt*, proceeded up the Demerara river to load with timber, at different times, after having been some time in the port. These vessels lost while there more than half their crews. There is a population of about 500 where they loaded, about fifty of them whites. These people bring the timber, and assist on board the vessels, and the most unreserved communication is kept up between them and the sailors. They were constantly going and coming, and the sick and dead were landed among them. But not a single case of yellow fever occurred among that population.

No case occurred spontaneously in the district of Mahaiconey; but Mrs. M., who resided there, contracted the disease in town, and died after her return home with black vomit. The disease did not spread. Private lodgings, during the epidemic, were in great demand for the ship officers and many of the seamen. In a memorandum of the 17th of January, 1853, I read as follows:

"*Number of Yellow Fever Patients in Private Lodgings.*—Yesterday, when visiting Mrs. Morison, wife of the master of the brig *Hope*, of Carrickfergus, Mrs. Fraser (white), who keeps the lodging-house, brought to my recollection that Mrs. Morison was the forty-second case of yellow fever which she had had in her house, of whom I had attended all but four. I have no doubt but that Mrs. Thompson (mulatto), at the corner of Main-street and Regent-street, had twice as many in her lodging-house; that Mrs. Wood (mestizo), had as many as Mrs. Fraser; that Mrs. Hobbs (mulatto), in Robb-street, had also as many; Mrs. Frances Porter (mestizo), in Water-street, had as many. Besides these, other houses took in sick seamen—such as Miss Catherine Mortimer (negro), and Mrs. Milleman (mestizo). Among them all, however, not a single instance of contagion, or any suspicion of it, has ever arisen. Nor have they, nor their servants, nor visitors, nor washers, furnished a single case of the epidemic disease."

On the 1st of January I find the following entry among my memoranda:

"*Number of Servants in the Hospitals.*—In the colonial branch there are forty-three constantly employed, and frequently changed. There are nine in the seaman's department, constantly employed and occasionally changed. Total, fifty-two constantly employed. Of these, since the commencement of the epidemic, two have suffered from yellow fever—viz., Maria de Monte, who is in charge of the Lazaretto, and is never near the fever patients, and whose case was complicated with pneumonia; and Manuel, the Portuguese interpreter, who never does duty as nurse. A nurse named Caruthers was laid up two days with a 'threaten-

ing,' and the head cook (mulatto), while suffering from orchitis, showed some taint of the epidemic. The number of servants stated is exclusive of those employed in clothes washing. The washing is done by contract, and none of those engaged have suffered. The servants employed about the hospital are Madeirians, negroes, mulattoes, Europeans, and coolies, in about equal numbers."

In the fatal cases which have occurred among the white natives, and excited the notice and consternation of the community, and who during their illness had "troops of friends" around them, not a single instance of contagion was suspected to have happened. Having watched, however, for instances (it being easiest to look after and record exceptional cases), I discovered among them one, which may be open to suspicion till the circumstances are explained. Mrs. W., white, native, aged about twenty-five; four or five years without having left the colony, sickened and died on the 17th of January, 1853. Her residence was a considerable distance from Water-street, in a hitherto healthy locality, on the Brickdam-street. Exciting cause of attack unexplained. Her maid-servant, English, elderly, four or five years in colony, had been very assiduous in her attentions to her mistress, but not more so than some of the relatives of the deceased. She, however, sickened, and had black vomit *incipiens* on the 28th of February following, but recovered. At the same time, the son of the deceased, two years and half old, sickened and died. Though the symptoms were somewhat obscure, and the diagnosis unsatisfactory, and the disease ended in convulsions (an infantile affection then prevalent), yet there can be little doubt that the cause of death was yellow fever. Neither the father, nor two elder children, nor son of the nurse (English and about ten years old), nor any other inmate of the house, suffered. The grouping of disease in this family was entirely exceptional among cases affecting *white natives*, for in all the other instances the attacks were isolated and singular. Now, although the distance of time between the first and second cases in this family is considerable, still there is an appearance of probability in the idea that the disease had been communicated from the mother to the nurse and child, until we know the history of the other cases in the neighbourhood. At this time the poisonous atmosphere had evidently extended to the Brickdam, for a fatal case in the person of a Scotch lad, a few months in the colony, followed that of Mrs. W. exactly a month afterwards, and in the next, but *separate* and *windward* dwelling, though between the houses and inmates no intercourse whatever had taken place. On the 24th of February also, about two hundred yards further up in the same street to windward, a second attack of the epidemic, in the person of Master B., occurred; and on the 25th there was another seizure, in the person of Miss S. (mestizo), about one hundred and fifty yards to the south. Both the latter were aborted attacks. Now, it is certain that none of these last-named cases had any personal communication with each other previous to the advent of their respective attacks, and they appeared *successively to windward*, until the nurse's seizure again manifested the infection in the old locality. Although the nurse and child, who remained in the house with the mother, contracted the disease, none of the friends from a distance who visited and closely attended the sick, suffered on their return home, but from fatigue.

There is the most unreserved intercourse between the ship masters and those connected with the public buildings, particularly of the custom-house chambers. All the public offices are in the one extensive building. Of officers permanently employed in this building there are sixty-three, and only two or three of them "coloured." Nine officers are in the custom-house. Two only of the whole number were affected, and these two were lads lately from Europe, and not in the custom-house, but the opposite end of the building, the registrar's office. Between these two cases there was an interval of several months; one recovered and one died. They were treated in the midst of their respective families (whites), without restraint or hindrance, and without any sign of contagion ensuing. On the other hand, Dr. Levin, resident surgeon of the hospitals, died on the 1st of May, after three days' illness, of the prevailing disease. He was a native of Russian Poland. He had been five years in the colony. The exciting cause of his attack seemed to have been fatigue and exposure to a thorough draught when violently heated by the pursuit of a thief whom he detected stealing his property. He also had been previously in the habit of passing the evenings in Robb and Water Streets, in the main site of infection. Drs. Butts and Goring, resident surgeons, each had an aborted attack; but both had lately arrived from cold climates, England and Canada. As already mentioned, many cases of yellow fever appeared within the Seaman's Hospital, in the persons of patients who had been admitted for other ailments; but they had all been exposed to the river influence previously. As the object of our observations was to ascertain the truth, and hold by it wherever it might lead, these cases were watched as sedulously as any partisan of contagion in yellow fever could desire. Among them, only two cases of an equivocal character appeared, and which bore favourably on the doctrine of contagion. They are as follows: George Philips, of the *Harkaway*, was admitted three days after his arrival in port to the Seaman's Hospital for rheumatic ophthalmia, on the 26th of February, 1853. On the 5th of March following, he was suddenly seized with a violent attack of yellow fever. As usual, there had been no separation between his and the yellow fever cases. Now the only suspicious point in this case, as regards contagion, is the fact that up to that period the *Harkaway* had as yet furnished no other case of yellow fever that I could ascertain. The other case was that of William Smith, of the *Montezuma*. These cases occurred very close on each other. After having been one day in harbour, he was admitted to the Seaman's Hospital for bubo, and was literally covered with *acne punctata*. On the 7th of March, after mixing as usual with the yellow fever patients, he was seized with what proved a fatal attack. In this case also none of his messmates had as yet suffered from the epidemic.

I have now stated all the facts that have come to my knowledge during the course of the epidemic, which favour the doctrine of the personal transmissibility of yellow fever. They were earnestly looked for among the countless opportunities for observation, and no others could be discovered. Those which were found have been honestly declared. In such a poverty of positive proof in the affirmative of the doctrine, it is no argument against those who disbelieve in the doctrine of contagion, to

assert that their proofs amount to negative evidence only. The experience of the present epidemic has confirmed that of the past, and the idea of contagion, which was then unanimously relinquished, has not been revived. Neither do facts countenance the fanciful compromise which some have offered as a settlement of what is scarcely a question among those who in modern times have seen the disease with their own eyes—viz., that it is *the type of disease in which black vomit appears only which is contagious.* In Demerara we would as soon think of asserting that intermittent fever in some of its forms and types is contagious, as to predicate it of any of the manifestations of yellow fever. It has already been observed that the state of the weather exercised a modifying influence on the manifestations of the epidemic. Heavy rains, with calms, creating a damp, hot, steamy atmosphere, or the prevalence of land winds, which are cold (comparatively), damp, and of low dynamic power, intensified the action of the poison, augmented the number of admissions, and increased the severity of the symptoms. The return of a dry, cool, clear, elastic atmosphere, with sweeping trade winds from the ocean, was always followed by mitigating effects. The *rationale* is easy. The condition of the weather first referred to oppresses the cutaneous and pulmonary functions, and thereby lowers the tone of health, and its power of resistance to the action of noxious agents, at the same time that the stagnation of the air is favourable for the accumulation of the atmospheric poison, whatever it may be. Moreover, it is likely that, at such times when the wind is from the land, and the sky is darkened (as it always is when land winds prevail) by dense black clouds, which overspread it from zenith to horizon, the air is positively vitiated by an excess of carbonic acid gas. The whole country is thickly covered by the most luxuriant foliage of grass, shrub, and tree (rarely fleshy leaved), the purifying influence of which on the atmosphere must be impaired during the temporary diminution of light. Whether during the darkened stagnant state of the air which then exists, the vivifying supply of oxygen be lessened, or the amount of carbonic acid be increased, effects detrimental to the vital force must ensue, which would be favourable to the ravages of the epidemic. It arrived on our shores at the latter end of the year, between the autumnal and vernal equinoxes, when the trade wind blows day and night over the face of the country, and it may have been owing to this accident—anachronism—that the invasion was so feebly commenced, and required so long a time to muster its forces.

The most important influence that could be brought to bear against the susceptible, was that of locality. As in the former epidemic, and as already noticed, the focus of infection was the shipping and Water-street. The very same houses that before signally suffered, were again visited with a like severity. The poisonous agent persists in its predilection for low, damp, crowded places, and putrid exhalations, and woe to the unwary or reckless who lived or lingered there. In the house next to that which Mr. Vervestein occupied, Mrs. B. died about two months after the first cases. Two tenants who successively occupied that house also suffered, but recovered. Persons who on business or for change of air came to town from the uplands of the interior, suffered. The Rev. Mr. B., safe at the missionary station near the penal settlement, came to town

on a visit, and died. Mr. Charpentier, from a more remote position in the Upper Essequibo, brought his family to town for the sake of coast air, they having suffered from intermittent fever, anæmia, and enlarged spleen, in the interior; two died with black vomit. Vessels that carried coal in bulk or patent fuel, were severely visited. The history of the *Syrophœnician* and *City of Peterborough*, and several other instances, illustrate this point. I have been informed of the case of a Portuguese boy, who appears to have contracted yellow fever by being much on board the *Grafton*, while discharging coals at Plantation Houston, at a time when the crew also suffered. The plantation was at the time healthy, and remained so till long after any influence could have been exercised by the presence of the sick boy, and between whose case and those that followed, no connexion could be traced.

Fatigue and checked perspiration and long-continued solar exposure precipitated the attack. Sometimes the heat of the berths below forced the officers to get up on deck at night, where they sat or lay with little covering to either feet or body; and a chill following was the signal of seizure. The *tolerance* of the poison which those residents who passed through the epidemic from its first feeble manifestations, had acquired, was seriously impaired by even a temporary removal from the colony, and a return to it within a few weeks. The crews of East India ships were severely visited. It might have been from the nature of the previous cargo, rice and immigrants, or from the long voyage inducing in the crew a scorbutic diathesis favourable to the reception of the epidemic poison. The depressing emotions of the mind were highly favourable to the action of the poison. Worry and vexation, crushing sorrow, panic, and even overwhelming joy, have each had its victim. Among the shipping, when the disease began, panic multiplied it; and the same emotion, in the open wards of the hospital, no doubt swelled the mortality. Constant and brisk employment, under awning, was the best prophylactic for the seamen. A week's idleness, which enabled them to gossip over the exaggerated tales of sickness and death, was enough to start the infection. The boy Lawrence (Seaman's Hospital, 11th of June, 1852) was convalescent, and in the morning of the day of his fatal relapse, was laughing in the convalescent ward. He was moved from his bed, which was sheltered from the wind, to make place for a bronchitic patient. He mistook the motive, became alarmed, wept and sobbed, and was not to be pacified; was seized with fever immediately; demanded to be sent back to us (the acute case ward), where he died. One of the most singular instances of what could only be accounted for by the effects of moral emotion in the genesis of yellow fever, occurred at her Majesty's penal settlement, in the high lands of Essequibo. A convict, native of Madeira, who had been imprisoned there for eighteen months, died on the 29th of July, 1852, of a well-developed attack; a minute and very interesting account of which was furnished me by Dr. Ringer, the resident surgeon of the settlement. Till then, no case of the epidemic had been seen or heard of in the uplands of the interior, and none followed till November, when the *simplex form* ran through the whole settlement, but without a single death. On the 17th of August, 1852, Dr. Ringer writes—" I am happy to say that this is the

only case that has occurred here; and lately we have had below the average amount of intermittents, and, with the exception of a few cases of bronchitis, we are at present very healthy." No exciting cause can be assigned for the appearance of this isolated case but a distressing and engrossing mental impression which the patient had endured by the intelligence of the death of his sister by *yellow fever* in the Colonial Hospital, a short time previous to his attack. Can the intense action of the faculty of Attention, long sustained, generate the peculiar morbid processes of yellow fever? or was the poison already wafted into the interior, and present, but too feeble to take effect, till the energies of the mind co-operated? A case not unlike this occurred in Berbice. The following is my note respecting it:—

"*Yellow Fever induced during the Epidemic Period, probably by the Action of the Faculty of Attention.*—Last week, Mr. S——n, who had charge of Mr. S——y's drug establishment in New Amsterdam, Berbice, died of yellow fever on the seventh day of his illness. Delirium and black vomit before death. He was a young Englishman, a *resident of the colony for five years and a half.* On the 12th of February last, he wrote a letter to Mr. S., in which he deplores the ravages which he understands were committed by the epidemic outbreak in Georgetown, and hopes that the disease will not extend to Berbice, as Dr. C. has informed him that he is just the very subject for yellow fever. Mr. S. wrote back an assuring and comforting reply; but which was never acknowledged. About six weeks ago, when cases appeared in Berbice, he again wrote to Mr. S. in the same desponding mood and manner. During the prevalence of the disease there he was even obtrusive in his visits to the hospital and dead-house, and dwelt with solicitous discrimination on the various post-mortem appearances, such as the different shades of colour in the liver, &c. It seemed as if the idea of yellow fever had taken complete possession of him as a fascination, and elaborated the fatal phenomena of the disease.—24th August, 1852."

May the early effect of exposure, in the cases of George Philips and William Smith, before referred to, be not due in part to the spectacles of disease which of necessity they witnessed in the wards, and the mental impression consequent thereon? Among the exciting causes of yellow fever may be mentioned the presence in the body of other febrile and irritating affections. A paroxysm of intermittent fever would sometimes set the morbid train in motion. I have notes of one case in which '*Rose*' (our colonial term for *lymphatic* inflammation), which is usually attended by one violent fever paroxysm, induced a mild attack in a native mulatto. The primary and secondary fever of small-pox also seemed to excite it. In illustration of this, I copy the following notes from my memorandum-book:—

"On the 6th inst. I was called by Mr. M'F. (engineer), who resides in a low, unwholesome part of Lacy-town (George-town), to see his little daughter, about four years old, white (creole), who had fever of two or three days' duration, but not severe, for which the father had purchased and given her 'Stable's Worm Mixture,' an American nostrum, of a pellucid syrupy appearance, the day previously, supposing her ailment to have been occasioned by worms. A dead lumbricoide, (an entozoon present perhaps in every child in the colony) was passed. However, her fever continued, and when I was called in her tongue was red tipped, but there was no suffusion of face nor injection of eyes, and the fever very much abated after she vomited the contents of the basin which was at my visit shown me. This basin contained about three ounces of apparently genuine black vomit.

I prescribed bicarbonate of soda and creosote, and when I returned in the evening I found that she had vomited only once, and that consisted of several ounces of clear acid fluid (white vomit), with a mere sprinkle of snuff-like black vomit. Next morning all the gastric and fever symptoms were quite gone, but her face and body were moderately covered with small-pox (a disease which is very prevalent in town, particularly Lacy-town). The residence of Mr. M'F. is in the immediate neighbourhood of that of Mr. Charpentier, whose children and niece from the Upper Essequibo suffered so severely. I regret I did not think of examining the child's urine for albumen on the day I first saw the case. She is now running about with a mild small-pox eruption, and to-day I requested the mother to make the necessary examination, and explained how.—9th of November, 1852."

"*Another Case of Black Vomit excited by the Fever of Small-Pox.*—Mr. M'F.'s eldest son, aged ten, was taken with fever the day before yesterday. There are two cases of small-pox in the second house to windward of Mr. M'F., and his youngest child is passing through the disease in a mild form. Yesterday the boy had epistaxis; last night, bilious alkaline vomiting, but not a red tongue. To-day clear acid vomiting, with specks of incipient black vomit, and tongue fiery. Urine is not coagulable. To-morrow I expect the small-pox to appear. None of the family have been vaccinated.—13th of November."

"The second son, aged nine, has fever this evening, for which I have given him the resolvent dose in proportion to his age.—13th of November."

"Yesterday evening, after my visit, the eldest son again vomited the clear acid fluid, with specks and streaks of black vomit. Some efflorescence of face, and fleabite-like spots on legs and back, to-day. Still some fever. The younger son, to whom the resolvent dose and oil were given yesterday, is quite free of fever this morning. The eldest daughter, now the last of the family, twelve years old, got fever this morning, and I have prescribed for her the resolvent dose. The eldest boy's urine is still non-coagulable. There has been no yellow suffusion.—14th of November."

"The eldest son's small-pox is developed to-day. The eldest daughter's fever has been extinguished by the dose.—15th of November."

"*The Resolvent Dose aborting both Yellow Fever and Small-Pox.*—There has been no return of fever, nor a trace of any exanthem, in the two cases of M'F.'s children to whom the calomel and quinine were given. They are running about in perfect health. The two cases in which this treatment was not adopted are going on to maturity, but mild. This is an extraordinary *dénouement*. There can be no reasonable doubt of all their fevers having been identical, and originating from the same compound causes.—17th of November."

"To-day I was again called by Mr. M'F. The boy whose fever seemed evidently aborted, got it again yesterday. There has been no separation of the family, and the two cases of small-pox have been allowed to run their course, the whole family sleeping in two small adjacent rooms, the one having constant communication with the other, and the children all together in the same room. I again prescribed the resolvent dose, but as the fever has been allowed to run on full twenty-four hours, I can scarcely hope to have it aborted again. When I went to see him I found him lying in the same bed with his brother, who has now got the secondary fever. Another cause of my visit was to see Mrs. M'F., who was delivered this morning of a dead child apparently full-sized, but which she reckoned only at eight months. Mrs. M'F. had had small-pox about twelve years ago, and was complaining much of ill-health (*malaise*) about ten days ago. She thinks she did not feel the motions of the child for the last week. The cuticle was separated off the entire body of the infant, except the hands. But there was no pustular eruption that I could notice. Was it the small-pox poison, circulating latently in the mother, which destroyed the fœtus in utero?—28th of November."

"The small-pox exanthem has showed itself to-day, chiefly on the forehead, and a few on the hands. The fever is quite gone. The resolvent dose was thus too

late. There has been no black vomit, nor irritability of stomach.—28th of November."

"A few (four) vesicles, with central depression, have shown themselves to-day on the face of Miss M'F. They were not preceded by fever, but are evidently variolous. In the case of this family I think the power of the resolvent dose is distinctly seen.—3rd of December."

Cases of pneumonia, and even bronchitis also, have appeared to rouse the latent poison of yellow fever. This opinion of the effects of febrile and irritant diseases developing the epidemic influence is derived from numerous observations. In two cases attacks were induced from the irritation of passing a bougie. In one case in the Seaman's Hospital the pain and irritation of a whitlow appeared to set the morbid process a-going. The case of the head cook, with orchitis, has been already noticed. In the case of Philips, before referred to in this chapter, may not the analogous pathological condition of the eye, or the spirits of turpentine which he had been using internally, have contributed to the early evolution of the epidemic symptoms? It is possible that the *sea sickness* from which Chandler suffered may have had a similar effect, in the development of the Barbadoes malaria, against which he had heretofore been proof. In one case a relapse was evidently induced by the local and constitutional effects of *alcohol*. The particulars of the case are as follows:—A young man, named Cherry, of the *Maria*, aged seventeen, was attacked by the epidemic, but being the son of a ship-master in the same employ with the captain of the *Maria*, he was sent to private lodgings to be treated on the 8th of September, 1852. The fever and frontal headache, which had been very severe, were completely removed by two doses of the calomel and quinine. The eye, however, remained slightly injected, and a few fungiform papillæ continued very red towards the point of the tongue. I watched him for two days, and finding that notwithstanding the appearance of the tongue and eye, he seemed quite recovered, and had appetite, I left him sitting out on the gallery of the lodging-house. On the 11th, however, I was called back, and learnt that at midday he had been suddenly seized with severe supra-orbital headache and violent fever without rigors; I found him very flushed in the face, and stomach very irritable. He rejected instantly two successive doses of medicine. The turgescence of the face was so great that I opened the temporal artery. Convulsions came on about eighteen hours after, which lasted several minutes, and affected chiefly the right side, and a loss of consciousness remained for some time afterwards, and delirium supervened at night. At the same time, the sparse injected papillæ passed into an uniform crimson edge and tip. But the urine was not coagulable during the first thirty-six hours of this relapse. After forty-eight hours it was bloody and very coagulable, and he died on the morning of the 15th, having vomited and purged black vomit all night previously. He confessed on the day of relapse that he had drank a large quantity of "high wines," out of a bottle of it which was in his room for cooking purposes, mistaking it for rum, and that instantly he was taken ill. Yet total abstinence from alcoholic drinks during the epidemic seemed to yield no protection whatever. Perhaps the largest proportional mortality in the shipping during the exacerbation of June, 1852, was on board of the *John*

Bunyan, a temperance ship. All hands were sick, including the captain; and six of them died. The captain, after his recovery, was much comforted by the moderate use of alcoholic drinks, which he took under a medical dispensation. The *Emily*, also a temperance ship, suffered very severely at the same time; and the *Janet Wilson*, although in her the *mortality* was not unusually large.

The stench of *bilge water* seemed sometimes to be an exciting cause. The master of the *Chevalier* volunteered the following information:—The pumps, he said, required overhauling, and one was brought on deck. The carpenter was told to put in his hand at the end of the pump, and haul out the filth which had obstructed it. He did so, and the stuff removed was very offensive. The carpenter complained and sickened immediately after, and died of his attack. He added, that the mate, then ill, also sickened after being engaged in work about the pumps.

One of the most favouring causes of the action of yellow fever poison was *infancy*. The constitution of the new-born or young white creole was highly susceptible. He or she was truly in the category of new-comers. Not only did the first fatal cases in town occur in children, but they followed numerously and repeatedly, as in the family of the Rev. Mr. C., and Mr. W., and others, too many to recapitulate. As these infants and children were not exposed to some of the physical and moral influences which favoured the attack on adults, their high susceptibility can be imputed to structural difference only.

The instance of Mr. Vervestein would lead to the supposition that the tendency to yellow fever may be *hereditary*. Many facts came to my knowledge which showed that *family predisposition* for this disease exists and is evinced under varieties of exposure. It was noticed in several cases that a scorbutic diathesis or sponginess of gums in the individual attacked, prognosticated the worst results. But the great predisposer—the pabulum on which the epidemic revelled—was the organization of the white who had recently arrived from an elevated or mountainous country beyond the tropics. Between the 1st of January, 1852, and the Christmas-day following, the total admissions to the colonial hospital were 3712 in-door patients, of which 662 suffered from yellow fever; while during the same time, in the Seaman's Hospital, there were admitted 1308, of which 1049 were cases of yellow fever. Thus in the former, which contains and represents the resident population, the ratio of admissions was only 18 per cent.; while in the latter, which represents the European and North American transient population, the ratio of yellow fever admissions is upwards of 80 per cent. And even this disparity would be greatly increased if the Portuguese immigrants who have but lately arrived in the colony, be struck out of the computation, for of this class does the great majority of admissions for yellow fever to the colonial hospital consist.

On the other hand, in looking for the causes which operate in retarding, or mitigating, or entirely shielding the action of the yellow fever poison, in the infected localities, we find that cheerfulness of mind, active but not laborious occupation, regularity of habits, and avoidance of night-air, sustain the tone of health, and militate against the inroads of the prevailing disease. The appearance of the eruption of small-pox seems to supersede the yellow fever poison. The presence in the system of evacuant

diseases, such as the advanced stages of phthisis when the tubercles have softened, and even gonorrhœa, seems to have a retarding power. Several instances in the hospital were observed of attacks supervening on the *healing up* of the discharging surfaces of burns, scalds, and wounds. On board the *Glenelg* and several other vessels, the free use of Sir W. Burnet's disinfectant fluid was found inefficacious. On board the *Susan*, in March and April, 1853, the use of chlorine gas seemed to arrest the infection. Four of her men sickened in succession and were taken ashore, and though they received the utmost attention, all four died. After the fourth case, the ship was well and repeatedly fumigated till the time of her sailing, three weeks afterwards, with chlorine gas. No other case occurred on board. I am not aware if the experiment was ever repeated, but it deserves to be.

Of all the protections, that of *complexion* was paramount. When the ships' crews were disabled by sickness (and that was in the majority of instances), their places were supplied by negro sailors and labourers. On board of many vessels, black labour alone was to be seen employed, yet among these labourers and stevadors a case of yellow fever was never seen. If to the table of thirteen months' admissions to the hospital, already given, be added a classified census of the population of the colony, information is furnished which enables us to arrive at something like precise knowledge on this subject. The following is the additional table:

Population of British Guiana on the Night of the 31st of March, 1852.

Natives of British Guiana	86,451		
Natives of Barbadoes	4,925		
Natives of other West India islands	4,353		
African immigrants	7,168	+ 722=7 ,890	Added by immigration till 31Dec. 1852.
Madeirians	7,928	+2,363=10,291	
Coolies from Calcutta and Madras	7,682	+3,296=10,978	
Old Africans	7,083		
English, Irish, Scotch, Dutch, and North Americans	2,088		
Not stated	17		
Aborigines, estimated at	7,000		
Ship's company of H. M. S. *Inflexible**	150		
Merchant seamen	295		
Strength of 2nd West India regt.	369		
Strength of 3rd West India regt.	298		
Strength of 72nd Highlanders	187		
Total on 31st of March, 1851	135,994		
Additions by immigration till 31 Dec. 1852	6,381		
	142,375	less 337 sailed=142,038 on 31 Dec. 1852.	

* The white troops were removed on the breaking out of the epidemic. The steamer *Inflexible* sailed before that epoch. The European and North American population are white. About an equal number of the native population, or creoles, may be estimated in the same category. The Madeirians and merchant seamen (although sometimes the cook or steward on board the merchant ships are negroes) may also be included in it. Deducting then the white troops and crew of the *Inflexible* from the grand total, it will appear probable that *on any day* in the year 1852, the relative proportion of the *white* to the *dark* races was as 14,726 to 127,276; while the admissions to the public hospitals for yellow fever were 1947 of the former to 59 of the latter.

From this it would appear that the liability of the white races to yellow fever, as compared with the dark, is as 13·19 to ·00004. But this would be rather an over-estimate of the risks of the whites, for although the calculation is correct for one day, it is not for the whole thirteen months. During the year 1852, 7670 seamen, the crews of vessels, arrived at the port of Georgetown. If we add one-twelfth to this sum, it will make a total of 8309 persons, estimated all as white, who for a longer or shorter period were exposed to the epidemic influence. This number should be added to that of the white population exposed, and the per-centage of liability will be as follows—*whites*, 8·430; *darks*, ·00004. This computation is irrespective of the effects of *residence* on the constitution. But the numbers afforded by the census returns are sufficiently great and detailed to authorize a purer and more ultimate analysis of the effects of complexion, or in other words, *cutaneous organization* on the liability to yellow fever among the population of the colony. We find that of 7890 African (black) immigrants, *none* contracted yellow fever.

Of 9278 West India Islanders (black and mulatto), 15, or ·16, contracted yellow fever; of 10,978 Madras and Calcutta Coolies (black, but fine-haired), 42, or ·38, contracted yellow fever; and of 10,291 Portuguese immigrants (white), 698, or 6·2 per cent., contracted yellow fever. The *aborigines* all reside in the interior, and out of the infected localities.

From the foregoing the importance of the skin, or of that constitution of the body which is associated with varieties of the dermal covering in the etiology of yellow fever, is at once apparent.

CHAPTER XV.

During the non-epidemic period, the reports of fever cases in the hospital books were very brief and simple. The name of the patient, his age, native country, and a few other statistical facts, and the type of his fever, were entered. Afterwards followed the prescription of the anodyne draught or aperient mixture, and six grains of quinine, in solution, every hour till six doses be taken, during the intermission. The next and last entry was, in ninety-nine cases out of a hundred, as follows,—"Cinchonism, apyrexia, purged, discharged."

When the epidemic again broke out, the old formulas of reports and prescriptions became obsolete. In private practice a similar revolution occurred. Indeed, during the epidemic period, the anodyne draught (spir. æther. nitros. ʒj., sol. acet. morph. gtt. xv., aquæ ℥ij.), which, in simple uncontaminated intermittent fever, acts on the fever and fever aches like magic, became positively dangerous, and simple quinine solution was not always successful in preventing the recurrence of paroxysms. The staple prescriptions of physicians were thus entirely altered since the advent of yellow fever.

When the epidemic poison was in moderate intensity or quantity, the results of treatment were highly gratifying. At such times when the disease was recognised and treated early, the chances of aborting the seizure were very favourable and decisive. If, in addition to this medium intensity of the epidemic influence, the favourable conditions of residence for a considerable period, or a cross in the blood, were added, the prescription was given with confidence of success. But at times, when the

system seemed thoroughly saturated with the poison; when every mucous tissue was more or less irritated by it; when no auxiliary or exciting cause was required; when the attack was violent on many points, and spontaneous; when, in fact, the exacerbations of the epidemic became pestilential, medication was powerless, and the morbid processes terminating in death were scarcely, if at all, modified or interrupted. The prime object of treatment, however, was to *abort the attack*. If that failed, after one, two, or three doses, although still much could be done in putting the patient in the best condition for sustaining the struggle and keeping off intruding complications, there was little room for active interference on the part of the medical attendant. Early attention to first symptoms among the susceptible was of priceless value in saving human life. Numerous instances of this occur in my notes. The following comparative case will illustrate the point:

"The ship *G.*, and the barque *M.*, both of Bristol, lay within cable length of each other: both within the infected locality of the season. The latter has been about a week longer in the harbour. The master of this vessel is very attentive to his men, and quietly and without exciting alarm ascertains the state of their health twice or thrice in every twenty-four hours. The master of the former is seldom on board his vessel. The master of the *M.* has informed himself of the premonitory symptoms and the treatment to be at once adopted on the instance of their occurrence, especially when they supervene at night, and until professional aid can be procured. The consequence is, that of ten cases which I have seen on board his vessel, all have been aborted; while in the other vessel three deaths have taken place out of four cases, and the fourth case, which is recovering, was brought to me a few hours after the attack, the master having then been aroused to the necessity of early measures."

"C. Bush, of the *Superior*, was admitted to the Seaman's Hospital on the 5th of April, 1853. He had accompanied a messmate the day before, who was admitted with marked symptoms of the prevalent disease, but which was soon aborted. Bush himself complained of frontal headache then, and I recommended him to remain and rest himself in the hospital for twenty-four hours (that he might be further observed). But as he then had no fever, and there was no capillary irritation visible on ordinary inspection; and as he had a small boil between his eyebrows, which might cause a pseudo headache, he was allowed, at his own request, to return to the ship, with a poultice to his boil. Next evening (on the 5th) he was brought back with all the symptoms of an attack violently developed, and died, having had black vomit on the second day after admission. Thus was twenty-four hours of valuable time lost, and thereby probably a human life."

The compound which is represented in the annexed cases by the symbol of 20 + 24, and which constitutes the aborting or resolvent dose, consists of twenty grains of calomel added to twenty-four grains of quinine. The *mistur. magnes.* there referred to, and which was so frequently used as a substitute for castor oil, and following the first dose of the resolvent, is composed of two drachms of carbonate of magnesia to two ounces of sulphate of magnesia, in eight ounces of peppermint water. As quinine in some persons induces nettlerash (from, I have reason to believe, the mechanical irritation of its spiculæ), it should, when exhibited in the solid form, either alone or in combination, be finely triturated before it is mixed with the calomel and administered. This fine division will facilitate its solution, and prevent its getting involved among the rugæ

and plicæ of the mucous membrane of the stomach. As a vehicle, I believe that syrup, or honey, or pap, are equally good, and superior to any other vehicle. Owing to the bitterness of the dose it was administered at one time in *capsules*, of which four contained the dose. But this mode is open to the obvious objection, that the physician and patient are at the mercy of the manufacturer, who, if dishonest, may include some cheap, or effête, or deleterious compound, as a substitute for the medicine intended. Another grave objection to the use of capsules was their slow solution, and they were finally disused at the hospital. If the stomach have a strong repugnance to the dose when mixed in syrup or pap, it then may be swallowed wrapped up in *wafer paper*. But I preferred that the dose actually touch and pass over the mouth and œsophageal surfaces, on its passage to the stomach. In preparing the irritable stomach for the reception of the dose, *creosote* had often an admirable effect; many instances of which will appear in the appended cases. The aborting doses were repeated at intervals of four or six hours; but at the time when the second dose was due, the purgative (either oil, or two ounces of magnesia mixture) interrupted the succession. Of the number of doses which have been administered in any individual case, I believe four has been the limit. In the case of Manning (Seaman's Hospital, 1st of Oct., 1852) that number had to be given before the attack was aborted, although in convalescence only a mere haze of albumen appeared in his urine. Sometimes, but rarely, the dose induces early and hyper-cinchonism; and, on the other hand, such a tolerance of it sometimes exists that, as in the case of Nichole (Seaman's Hospital, 28th of Jan., 1853), four doses did not induce cinchonism. When the disease is taken early, or the epidemic pulsation is moderate, one dose followed by the purgative will generally be adequate to its removal. In practice, sometimes, the intermediate purgative is beneficially omitted, and the *coup sur coup* system answers. Thus, on the 9th of December, 1852, in the afternoon, I went on board the *James Erving* to see the mate, who was suffering from yellow fever from the previous night. He had taken a purge in the morning, and as I could have no opportunity of seeing him again that evening, I left a prescription for two doses—one to be given at once, and the other eight hours afterwards. Going back next morning, I found he had retained both doses, and the symptoms were each and all dispersed. The powder had acted freely on the bowels. I did not require to see him again. We found the aborting dose less efficient against relapses than primary attacks; hence the urgent need for avoiding the infected localities for a considerable period after recovery—a condition, however, impossible in the case of the unfortunate seamen.

One of the earliest and most uniform effects of the dose in the treatment of aborted cases, is the removal of the headache symptom. It is likely that this symptom properly belongs only to the early stages of yellow fever, and that its tendency is to subside spontaneously; but its departure is unquestionably hurried by the agency of the medicine, and the first or second dose is generally adequate to its removal. While the same amount of the compound given in small and frequently repeated doses would infallibly cause salivation, such an effect is of the rarest occurrence in the large doses, and when it has happened, never, that I have seen, but

mildly. I have prescribed it, without injury, to females far advanced in pregnancy; and to my own infant, three and a half months old, in a similar dose, proportioned to the age, and found it attended with no practical inconvenience of any consequence. The *modus operandi* of the dose in aborting yellow fever, probably, is not by the constitutional effects of mercurialization. Calwell (Seaman's Hospital, 25th of March, 1853) while accidentally salivated for another malady, got a violent attack, *which was aborted by the usual method.* Three doses were in this case required and found sufficient, and without any increase of the salivation. The aborting dose should be used as early as possible. When a state of apyrexia is induced, it may be relinquished; the end is attained: but if the urine has become coagulable, or the epithelium of the tongue has begun to peel, it is of no use pushing it further, the time for its administration is past, and subsequent to this it will be a noxious irritant.

From information which we received through the surgeons of the West India Mail Steamers, we could see that the use of calomel and quinine in the treatment of the epidemic was not understood, or rather was completely misunderstood, among the West India Islands. We were told that it was pushed on in various doses and proportions, through all stages, and whether the stomach retained it or not. Nothing could be more injudicious. Its benefits are confined to the first and early stage; and though, if the case run on, some mitigating effects may flow from its previous use, still it is for *aborting the attack completely and at once* that it is prescribed and is suitable. Sometimes the disease is incompletely aborted,—that is, although the disease does not proceed to the second stage, a certain amount of febrile action still continues after the resolvent has been pushed to a reasonable extent. It was the practice then to give half an ounce of camphor water and spirit of Mindererus every three or four hours, till the skin became cool and soft. Should, however, the stage of acid elimination supervene, this medicine is stopped, and small doses of bicarbonate of soda and nitrate of potash substituted. The *rationale* of this treatment is not so obvious as it would appear. The acid elimination seems in many cases a salutary act. the disease sometimes terminating with that stage; and the fever very often and so suddenly ceases, as to impress the belief that the phenomena are associated as cause and effect. Then why use antacids? Perhaps until more is known of the part which the acid elimination plays in the pathology of the disease, the medical practitioner should use his test paper frequently, to enable him to know when an excess of alkali has been used, that the quantity of soda, potash, or chalk may be kept up to the point of neutrality only. For if it be a critical evacuation, but salutary only when moderate in quantity, an excess of the medicine should be avoided, as it is well known in chemistry that the presence of a free alkali is apt to induce an opposite condition where there exist the elements to bring about such combinations. It is therefore to some extent in the power of the practitioner to command this symptom. We used the compound of nitrate of potash and soda in the proportions of from five to ten grains each for a dose, because we believed we saw it improve the condition and comfort of the patient, and speculated that among its other effects, the benefit might arise from its gentle action on the kidneys, and the relief of that uneasiness of the

stomach which the presence of free acid in its secretions always creates. The selection of the alkali is not indifferent. Except the nitrate in small doses, potash and its salts were found objectionable. Liquor potassæ and the carbonate, unless excessively diluted, possess a causticity which render them difficult of tolerance, and sometimes distressing to the denuded mucous membranes. Magnesia and chalk are sometimes eligible; but the most generally suitable was the bicarbonate of soda. When the mucous surfaces, as indicated by the tongue, were denuded of epithelium, the use of *gum water* was decidedly beneficial. It lubricated, defended, and soothed the raw surfaces. The strength was generally three drachms of the purest powdered gum arabic dissolved in six ounces of cold water, and a table-spoonful of this given every one or two hours. The patient at last gets tired of it; but for thirty-six or forty-eight hours of the most critical period of the disease, it is used without dissatisfaction, and then can be substituted by, or alternated with, arrow-root pap. When the heat of surface was ardent, the *wet sheet* or *blanket* was used for the reduction of temperature by evaporation, with frequently very good effect. But in the late stages of the disease, when the skin was cool or cold, the patient seemed to have an instinctive craving for its reapplication, and frequently asked to be put into it. There would appear to be two causes for this feeling. We find it to exist in cases in which black vomit has been copious, and the associated thirst distressing. Also, as in the case of Tomlinson, where there has been no black vomit of any consequence, and the breath is highly ammoniacal. In the former case the stomach ceases to be an *absorbing* viscus in anything like the proportion of its secretions and transudations. The skin is therefore employed in reducing the crasis of the blood by the absorption of water, as ship-wrecked mariners are said to quench their thirst. But not only does the skin afford an inlet for the imbibition of diluting fluids, but the softening of the cuticle would seem to afford an additional outlet for the noxious elements of the circulation; and it is probably in this direction we must in future look for auxiliary means of relieving the blood of its poisonous, metamorphosed, and effete constituents, the onus of which is now thrown on such vital organs as the stomach and lungs. At one time, the heat of the surface was so ardent and persistent, that the wet sheet failed to reduce it effectually. For these cases, I once or twice only tried the effects of tobacco injection.

The *food* during the course of yellow fever should be of the blandest description: chicken tea, arrow-root, sago, and barley water constituting the chief articles; and these should be taken when the stomach is at all irritable, in minute quantities at a time. This rule also applies to drinks of all kinds. The patient is greedy for a large draught of fluids; but by sucking them through a glass tube of small bore, or by the tea or table-spoonful, they are much more likely to be retained. A cold infusion of oatmeal was found an agreeable drink for the Scotch seamen, of which they did not seem to tire. A dislike of sweets was observed among the patients, and when lemonade was asked for, the usual quantity of sugar was objected to, probably from its rendering the liquid too dense for ready absorption by the stomach, and therefore less quenching. *Tea* was found so uniformly to disagree with the patients, and cause vomiting, particularly in the advanced stages, that at length it had to be expunged from the yellow

fever dietary. Dilute alcoholic drinks were given freely, and with good effect. Unfortunately, the quality of the hock wine to be obtained was much inferior to that used in the former epidemic; and from its acidity, frequently disagreed with the stomach, and fell into disuse. Where brandy could be obtained pure (tolerably free from acidity and fusel oil), and was well diluted with water, that spirit answered every indication. Sometimes the effervescing wines were relished and retained, but they are very liable to the objections of containing foreign matters, and the products of mismanaged fermentation.

During the course of the disease, *auxiliary treatment* was required to meet contingent symptoms. This was embraced chiefly in the use of local and general blood-letting, croton oil, morphine, ether, vesicatories, hydrocyanic acid, and the creosote before referred to. Cupping, leeching, and blistering were found useful in relieving the primary head symptoms and irritability of stomach, when applied respectively to the nape of neck or epigastrium. Tenderness over the liver seemed also benefited by these applications; but I cannot say I have ever seen any benefit resulting from their application over the kidneys, with the view of relieving that congestion of which albuminosity of the urine and suppression are the indices. In only one instance have I seen strangury follow the application of blisters in this malady, and in that case it seemed to exercise no injurious effect. Seeing that herpes labialis was a favourable indication, and arguing that their vesications might be beneficial from their situation at the termination of the mucous surfaces, we created on several occasions an artificial herpes, by brushing the lips and parts around the mouth with the acetic ether-infusion of cantharides. This operation, however, was without results. When the primary reaction was violent, and the face was turgid, and the head symptoms severe, arteriotomy was performed, and with benefit. In a few such cases, and when the patient was young, strong, and full-blooded, and where the dynamic congestions were so violent that the vessels yielded to the turgescence and impulse, and blood-corpuscles without tube-casts, or even but a haze of albumen, was present in the urine, the arm was opened, and free bleeding relieved the tension of the vascular system. In such cases, convalescence was slow and unsatisfactory, but the immediate results had been beneficial. In general, the bowels responded easily to the action of mild purgatives; but a cluster of cases occurred about fifteen months after the commencement of the epidemic, in which *croton* oil was required to follow the resolvent dose. Hydrocyanic acid was supposed beneficial in a few cases in abating the primary irritability of the stomach; and being easily taken, may be borne in mind by the practitioner, as a variety of such resources are at times required. *Ether* was frequently attended with marked advantage in removing or abating the distressing symptom, hiccup; but we used it also as a diffusible stimulant, and where acceptable to the patient, is fully equal to brandy for that purposes.

Of all the auxiliaries which must be occasionally impressed into the service of the patient, by far the most important is *morphine*. I am inclined to think that the type of the present epidemic tolerates that drug more easily than the last; but there is no doubt that its management is better understood now than then. Its administration, however, still involves more knowledge, discernment, and judgment on the part of the

practitioner than any other drug he has to deal with. In the present epidemic, the most salutary effects were observed from its use in the beginning; but a number of cases occurred in which it was so manifestly detrimental, that its use was about being relinquished again. In some of these cases in which it was injurious, its first effects for some hours seemed favourable; and for a considerable time, no criterion was known for its administration. Various conjectures arose, at the same time, as to the mode of injurious action both of morphinism and hypercinchonism. Following the cue of Frerich's theory, it was supposed that the drugs supplied some element to some other casual element in the blood, as *emulsine* and *synaptase* converts harmless amygdaline into poisonous hydrocyanic acid, or a diastase quickens starch. As quinine and morphine are alkaloids, and contain nitrogen, and are very complicated in their constitution, and possess high combining powers, the hypothesis was for a moment feasible. But I suspect that the injury frequently arising from the use of morphine is chiefly due to its action on the secretions of the kidneys. It impairs that function; and where the march of symptoms is already verging on that of urinary suppression, although the tranquillizing effects of the drug may be pleasant for the time and well marked, it indirectly induces head symptoms, and adds to the uræmic poisoning. The rule therefore would be, *not to give it when there is suppression or tendency to suppression.* Of course, if the restlessness or sleeplessness or suffering is extreme, it becomes a question for deliberation, whether, even in suppression or tendency to it, the relief which is sure immediately to follow the dose of morphine will compensate for the jeopardy of life. The necessity must be extreme indeed that would justify, for present ease, the surrender of the smallest chance in favour of ultimate recovery. Its beneficial effects are most visible and unqualified in those cases wherein the disease has been imperfectly aborted, and which, after a few doses of the aq. acet. ammon. and camphor water, will induce a good night's rest, out of which the patient awakes free from disease. Morphine is perfectly safe while the urine is non-albuminous. The effect of yellow fever on the system is to make it sensitive to narcotics. Cases of delirium tremens with a taint of the epidemic will not bear that liberal use of opiates of which it is normally so tolerant; and a dose such as that which the anodyne draught contains, is too much for yellow fever, though never found so for intermittents. After many observations, I have come to the conclusion that, for an adult, eight drops of the solution of the acetate (one-fourth of a grain) should be the maximum dose, and should rarely be repeated within twenty-four hours.

The "smouldering form" of yellow fever is best treated by rest, the recumbent position, cool drinks, and abstinence from any but the lightest food. The patient, however, should be closely watched, although interference is seldom required, the curative and conservative power of nature being adequate to the perfect restoration of health in almost all these cases. Inflammatory complications were treated on general principles; and in pneumonia, the tartrate of antimony was borne well.

Before concluding, it may be instructive to notice the results of a few unsuccessful experiments, undertaken during the course of the epidemic. The chief of these was the trial of the use of belladonna as a prophy-

lactic. Remarking the close analogy of yellow fever with scarlatina, I drew up a representation to the Board of Health, and suggested an universal distribution of the drug among the seamen from the moment of their arrival in harbour, in the same doses as had been employed in Europe for the prevention of scarlatina. It was styled "the protection fluid," notices of which occur in the annexed cases. The Board, with the utmost alacrity and zeal, took up the subject, and carried out the experiment for almost two months as efficiently as was possible to be done. Among the patients who presented themselves afterwards at the hospital, I never observed on the skin or eye any of the specific effects of belladonna; but there is no doubt, from the exertions of the Board, and the spirit of the ship-masters and mates, it had been, with very few exceptions, regularly, steadily, and for a prolonged period, administered. This prophylactic for about a fortnight obtained that spurious popularity for success which is not uncommon, and is the result of accidental circumstances. The intensity of the epidemic had suffered one of those periodical fluctuations before noticed, and the *post hoc* was mistaken for the *propter hoc*. But the mistake did not last long, and it was soon evident that the epidemic influence was wholly unaffected by the medication with belladonna.

Early in the epidemic I obtained from Dr. Thier some carefully prepared bisulphate of lime, and used it for black vomit, without any advantage resulting. A skilful chemist, Dr. T., under the impression, from certain observations made on himself, that an important link in the chain of morbid phenomena was an incapability in the stomach in oxygenating nutriment—in other words, of performing digestion,—suggested the use of pepsine in some of our cases. It was prepared and tried in five cases; all died. Of one of these only was a post mortem examination made (Gambling, Seaman's Hospital, 9th of April, 1852); and, although he had not had much vomiting before death, his stomach was eroded in great deep longitudinal stripes, and the lesions were more severe than I had ever before seen. It is clear that pepsine is injurious in yellow fever, and from the knowledge of this fact perhaps some light may fall on the obscure pathology of the stage of acid elimination.

In the beginning of 1853, her Majesty's vice-consul at Bolivar, Venezuela, becoming afflicted with the *cacoethes scribendi*, inundated the several West India governments and colonial newspapers with accounts of the discovery made by a Madame Orfila of a certain, sovereign, and infallible cure for black vomit, effected by a plant indiscriminately named *verbena* and *vervena*, which is very abundant. And of this plant a specimen *leaf* was always forwarded, which, like the brick, displayed as a specimen of a house, in the old joke of Theophrastus, was intended to convey full and complete information of the plant. There were, however, often *two* leaves sent, one larger than the other. The one was stated to belong to the *male*, and the other to the *female*, verbena. The name of Orfila, although in this case it designated an ignorant old half-blood Indian woman, no doubt promoted the renown of this new remedy. One of the worthy consul's circulars, of course, reached Guiana, and his excellency the governor, as it came in official garb into his hands, very properly referred it to the surgeon-general, with instruction for a trial of

the remedy, and a report of results to be forwarded to the Government secretary's office. The statements of the circulars contained abundant evidence of scientific ignorance, and were replete with absurdities. But still it was possible that a savage or an ignorant person might stumble on a great medical discovery—the cinchona, for example—and be unlucky in the expounder. I therefore set about obtaining information which would lead to a knowledge of the plant really meant. As the genus verbena is pretty extensive, including even East India teak in its family, it was not so very easy to determine the species and variety so highly recommended. At length, having obtained an entire plant of what was admitted by those, who should know, to afford the genuine remedy, I discovered, through Mr. W. H. Campbell, whose name is a sufficient guarantee for its accuracy, that this treasure was the *stachytarpha Jamaicensis.* The nauseous and disgusting compound was prepared and administered precisely according to directions, and, it need scarcely be added, unsuccessfully. Its want of success, however, was less matter of concern, as about this time the worthy vice-consul, ever anxious, as he declared himself, for the welfare of mankind, announced through the newspapers the discovery of another sovereign and infallible remedy for the same complaint.

It requires apology for referring to this ridiculous affair, but the verbena of Madame Orfila has been, I perceive, the subject of grave conversation in the London Epidemiological Society.

CHAPTER XVI.

There is a material link in the chain of evidence yet to be supplied before the following definition can be dignified by the epithet of theory. It must be demonstrated to be a fact, by submitting the arterial tubes and capillaries to microscopic examination, that the epithelial covering of these vessels does really undergo the desquamatory process which is so noticeable in the open mucous tissues. This has not yet been attempted, and till accomplished the generalization now offered, though it explains the chief morbid phenomena and their order, can be received only as an hypothesis. *The efficient cause of the disease known as yellow fever is an aërial poison, probably organic, which requires a certain temperature for its generation and existence, and affects special localities and persons. This poison attaches itself to the mucous surfaces of the human body. One of the primary effects of such contact, when the quantity is adequate, is to rouse the system into febrile reaction, and to excite through the stomach and intestines an effort to expel the noxious agent. There is reason to believe that this compulsory effort is sometimes successful unassisted, but is materially aided by the action of certain medicinal substances. In the event of the expulsory effort being unsuccessful, the effect of this poison is to act destructively on the epithelial structures of the body by inducing a specific irritation in the basement membrane, by which, and by allied consecutive lesions, the arterial and capillary tissues are impaired, the viscera become congested, the blood thereby contaminated by suppressed secretions, and fatal hæmorrhages ensue.*

THE END.

Contents of No. XVI.—October, 1855.

"This Review sustains its long-established character for liberal opinion, honest speech, and literary ability. On the whole, the number is one which will sustain the credit and probably extend the influence of the Review."—DAILY NEWS.

"The current number of the *Westminster Review* is, barring its sceptical teachings on theological questions, one of the best we have seen for some years. It has not, indeed, been surpassed by any of its quarterly contemporaries for a considerable period."

MORNING ADVERTISER, Oct. 4th, 1855.

"A hundred pages are filled with brief discriminating remarks on the chief British and foreign publications issued during the last quarter. We are inclined to think this the most practically useful portion of the whole number."—THE ATLAS.

"We observe, with no small degree of satisfaction, among the remaining contributions, an ingenious essay, descriptive of 'The Position of Woman in Barbarism and among the Ancients.' This is one of the articles to which we referred in the outset of these remarks, as evidencing an uncommon research and an unusual excellence, whether as to novelty of design or importance in respect to the deductions arrived at."—SUN, Oct. 19th, 1855.

"We place the *Westminster* at the head of its class. It is more vigorous than the 'Edinburgh,' better written than the 'Quarterly.'"

SUNDAY TIMES.

"There can be no question of the ability of this Review."

SHEFFIELD INDEPENDENT.

"The usual admirable digest of 'Contemporary Literature.'"

GATESHEAD OBSERVER.

"This is unquestionably one of the ablest of our Quarterlies. First-rate men contribute to its pages—the articles are generally of sterling merit—the subjects at once profound and popular—their treatment elaborate and extensive, powerful in thinking, and attractive in style."

GLASGOW CONSTITUTIONAL.

"We must say that the present number of the *Westminster Review* is really a capital number. There is much able writing in it, and it contains several articles that are at once both sound and seasonable."

HUDDERSFIELD EXAMINER.

"This Quarterly contains several papers of high merit, both theological and political."

CAMBRIDGE INDEPENDENT.

"The interest of the *Westminster Review* is sustained by the present number, which is equal to any we have yet perused."

DONCASTER GAZETTE.

"This number is an exceedingly good one."—BRADFORD OBSERVER.

"If the conductors of the *Westminster* continue to provide its readers with mental food at once, so substantial and attractive, it need fear the rivalry of no contemporary whatever."

EDINBURGH DAILY EXPRESS.

"The *Westminster* contains its usual excellent series of articles on Contemporary Literature."

PLYMOUTH AND DEVON JOURNAL.

"This number, which is certainly equal to any of its predecessors, concludes with its usual review of Contemporary Literature. To the student this portion of the contents of the *Review* is invaluable."

OXFORD CHRONICLE.

THE GENERAL CHARACTER OF THE REVIEW:

"A periodical which no one can suspect of narrow and illiberal tendencies."—THE TIMES.

"The *Westminster*, old in name, indeed, is new in feature, and is an evidence of the strength of the new forces that are seething under the parched crust of modern society. It gives us suggestions, anticipations, hopes. It may not always fall in with the current in which our own ideas have been used to flow, it may run right across the stereotyped lines of rail-road in which modern thought is bound to travel, but whenever it does so, it brings its justification along with it. It is not only startling, but often profound, and as a rule both vigorous and honest."

DAILY NEWS.

"Exhibits a very effective coalition, of independent minds. * * * Energies such as are seen at work in the number before us, (*the Review*) never exhibited in its best days. The old declamatory verbiage has been discarded for serried reasoning and rigid strength. The industry of the various collaborators is not less remarkable than the consistency and common purpose pervading every page, and he who differs from what he reads, yet does homage to the power of the erring writer."—GLOBE.

"The *Westminster Review*, which has failed under so many managements, under its new management promises to be no failure at all. Good healthy blood stirs in it, and we have little doubt that it will not only win its way to as high a point in public estimation as it held in its best days, but that more practical results will follow, and it will be found to *sell*. With equal ability, we observe a larger and more catholic spirit. Brought as it now is into complete harmony with the spirit of the time, and having its pages furnished by thinking men as well as able writers, it will take gradually a sure hold of the public, and will be *bought* by those who heretofore have been satisfied to read it as it came to them borrowed from the circulating library. We wish its new conductors all success. They are in the right way to obtain it."

EXAMINER.

"When we compare the two Reviews (*Quarterly* and *Westminster*) and point out the greater merits of the *Westminster*, we try it by a very high standard, and pass on it a very high eulogium. The new life it has received is all vigorous and healthy. * * * In general, the *Review* is characterized by great novelty and great vigour."—ECONOMIST, July 10th.

"We have learned to look forward to each number of the *Westminster Review* with expectations rising from a cause far superior to anything of personal sympathy. So much thought, learning, and eloquence, w rarely meet elsewhere."—LEADER.

"The *Westminster Review*, under its new editorship, seems destined to achieve a very distinguished position as a critical Titan, and to become a powerful agent in the mental and moral progress of the age."

WEEKLY DISPATCH.

"The *Westminster* well sustains, in every successive number, the high literary pretensions with which the New Series started. * * * Scarcely inferior to, or less famous than the *Edinburgh*, in those palmy days when Macaulay and Stephen shed over its pages the gorgeous or subdued splendour of their historical disquisition."—NONCONFORMIST.

"Its principles remain the same as of yore, though enforced with far more vigour."—OBSERVER.

"Distinguished by high literary ability, and a tone of fearless and truthful discussion which is full of promise for the future."—WEEKLY NEWS.

"The variety and ability of the articles are great, and the general tone of the Review is unequivocally the expression of matured thought, and earnest and elevated convictions."—INQUIRER.

"There is no one of the Quarterly Reviews to the periodic appearance of which we look forward with more interest than the *Westminster*. Inde-

Testimonies of the Press—*continued.*

pendently of its long articles, which are very generally marked by an air of freshness and independence, its condensed view of 'Contemporary Literature' would alone entitle it to a high rank as a critical organ, and make it a valuable guide to those who wish to obtain a comprehensive survey of recent literature at home and abroad."—EDINBURGH GUARDIAN.

"Second to no quarterly journal in point of ability, it is superior to them all for independence of thought and progressive tendencies. The politics of the future, rather than of the past, as represented in the *Quarterly*, and progress commensurate with the growth of intelligence rather than the so-called liberality of the *Edinburgh* mark its contents. On all subjects, its contributors manifest a freedom of spirit calculated to render it one of the most powerful organs of criticism in our day."—SCOTTISH PRESS.

"We are glad to find that this Review is rising in public appreciation, as it deserves, under its present spirited management; and that it has quite recovered, if not increased, the popularity which it had under John Stuart Mill. * * * Fine writing too often of itself sustains the reputation of our quarterlies; fine and deep thinking is less cared for; but in the union of these two seldom united qualities the *Westminster* may be fairly said to be at present pre-eminent."

COVENTRY HERALD.

"Robust intellect and heartiness of purpose continue to mark the *Westminster*. * * * Though the *Edinburgh* and *British Quarterly* and others have often valuable articles, yet on the whole the *Westminster* seems to have won the lead of them and to be keeping it."

SHEFFIELD FREE PRESS.

"Whatever may be thought in some quarters as to the pervading tone of this journal, no candid mind will dispute its ability."

BRADFORD OBSERVER.

"Everybody has a good word for the *Westminster*. We venture, without fear of contradiction, to aver, that it is the ablest written and the best edited of the three great Quarterlies."—SHERBORNE JOURNAL.

"The contributors to the *Westminster* are bold, masculine, independent thinkers, and however we may dissent from the views expressed by some of them, we cannot but admire the literary talent, great knowledge, and profound scholarship they one and all evince. * * * At no former period of its history did the *Westminster Review* stand so high in public estimation, or so well deserve extended success as it does at the present moment."

NOTTINGHAM GUARDIAN.

"The ablest of the Quarterlies."

NOTTINGHAM REVIEW.

"The *Westminster* holds on bravely in the career started under the new editorial *régime*, grappling in an intrepid and uncompromising spirit of inquiry with what may be called the organic, social, political, literary, and philosophical questions of the age."

LIVERPOOL MERCURY.

"The manifest improvement and infusion of new life and spirit into this Quarterly, which marked the first number of the New Series, are well kept up."—STAMFORD MERCURY.

"We have no hesitation in saying that the *Westminster Review*, in point of talent, is not surpassed by any of its numerous contemporaries. * * * Acknowledged to be one of the very best of the Quarterlies."

CAMBRIDGE INDEPENDENT.

"The *Westminster Review* has taken a foremost, if not the very first position in the highest class of periodicals. Indeed, we think we may say it has not its equal."—BEDFORD MERCURY.

"There appears no diminution in the searching ability and masterly style of exposition which have characterized the various contributors to this first-class Quarterly since the issue of the New Series."

GLOUCESTER JOURNAL.

CONTEMPORARY LITERATURE:

"This important section of the Review must prevent its ever being exclusively political, while it constitutes a strong claim to superiority over other periodicals which do not present the whole field of literature so carefully explored and so genially appreciated and described. The departments of this survey are obviously and of course by different hands; but the industry, conscientiousness, and geniality of the criticism seem to be common to all. Each head is, in fact, a separate treatise, full of matter from the mind of the writer, and by no means a mere string of notices of new books."

DAILY NEWS.

"An excellent index to the productions of the quarter, and will make the public acquainted with them at small expense of time, trouble, and money."—ECONOMIST.

"The articles are well done, and they place the reader of the Review in possession of a kind of information which he wants about the literature of the day."—EXAMINER.

"It may be said that they are at once concise and clear, and that much information is afforded in a very small compass."—OBSERVER.

"Written with an evident desire to do justice, and with an honesty of intention which is one of those indestructible evidences of a true catholicity of criticism which tends so much to enhance the moral value and to elevate the mental standards of literature."—WEEKLY DISPATCH.

"Every book of importance meets with a sound and careful appreciation, valuable alike for its depth and seriousness."—CARLISLE JOURNAL.

"Ninety pages of small type are devoted to this department, forming, as it were, a panoramic view of the progress of literature and science in all their various divisions and subdivisions; and when it is remembered that men of the highest intellectual eminence and literary attainments, have consented to assist in carrying out the object which the management has in view, the design will doubtless be fully appreciated by the reading public. We hail it as a step in the right direction, and as a necessary adjunct to a critical Review which professes to be the abstract and chronicle of the current literature and opinions of the age. We are not anxious to see any of our Quarterlies become mere enlargements of a bookseller's catalogue, and the comprehensive elaboration which distinguishes our present Reviews substituted by a technical and comparatively unimportant enumeration of newly published works; nor is there any likelihood of this objection being made against the plan now adopted, the space devoted to it being such as to enable the conductor to combine all the advantages of a lengthy notice, and all that scholarship, careful analysis, and judgment can supply, condensed into as moderate a space as possible, for the advantage of the reader. We have no doubt, therefore, the improvement will be welcomed by that large class of students who find it impossible not only to keep pace with the amazing productiveness of the press in every branch of learning and general literature, but who are absolutely incapable of obtaining a mere outline of the publications which, either in this country or abroad, are moulding, animating, and changing the thoughts and opinions of the world; while the mere dabbler in literature, the man of business, and the earnest searcher after truth, will all equally prize so valuable an epitome of our intellectual, moral, and religious progress."

OXFORD CHRONICLE.

"The critical miscellany forms one of the most valuable features of the Review. Nowhere else, indeed, can we find so copious an account of current foreign literature, or one written with a fuller knowledge of the authors and works flourishing contemporaneously among our continental neighbours."—THE PRESS.

Contents of No. XV.—July, 1855.

Contents of No. XIV.—April, 1855.

Contents of No. XIII.—January, 1855.

Contents of No. XII.—October, 1854.

Contents of No. XI.—July, 1854.

Contents of No. X.—April, 1854.

Contents of No. IX.—January, 1854.

Contents of No. VIII.—October, 1853.

Contents of No. VII.—July, 1853.

Contents of No. VI.—April, 1853.

Contents of No. V.—January, 1853.

Contents of No. IV.—October, 1852.

Contents of No. III.—July, 1852.

Contents of No. II.—April, 1852.

Contents of No. I.—January, 1852.

THE WESTMINSTER REVIEW

Is designed as an instrument for the development and guidance of earnest thought on **Religion and Theology, Social Philosophy, Politics, and General Literature**; and to this end the Editor seeks to render it the organ of the most able and independent minds of the day.

The fundamental principle of the work is the recognition of the Law of Progress. In conformity with this principle, and with the consequent conviction that attempts at reform—though modified by the experience of the past and the conditions of the present—should be directed and animated by an advancing ideal, a comparison of the actual with the possible is steadily maintained, as the most powerful stimulus to improvement. Nevertheless, in the deliberate advocacy of organic changes, it is not forgotten, that the institutions of man, no less than the products of nature, are strong and durable in proportion as they are the results of a gradual development, and that the most salutary and permanent reforms are those which, while embodying the wisdom of the time, yet sustain such a relation to the moral and intellectual condition of the people, as to ensure their support.

In regard to **Religion and Theology** the Review unites a spirit of reverential sympathy for the cherished associations of pure and elevated minds with an uncompromising pursuit of truth. The elements of ecclesiastical authority and of dogma are fearlessly examined, and the results of the most advanced Biblical criticism are discussed without reservation, under the conviction that religion has its foundation in man's nature, and will only discard an old form to assume and vitalize one more expressive of its essence.

The Review gives especial attention to that wide range of topics which may be included under the term **Social Philosophy**. It endeavours to form a dispassionate estimate of the diverse theories on these subjects, to give a definite and intelligible form to the chaotic mass of thought now prevalent concerning them, and to ascertain both in what degree the popular efforts after a more perfect social state are countenanced by the teachings of politico-economical science, and how far they may be sustained and promoted by the actual character and culture of the people.

In the department of **Politics** careful consideration is given to all the most vital questions, without regard to the distinctions of party; the only standard of consistency which is adhered to being the real, and not the accidental relations of measures—their bearing, not on a ministry or a class, but on the public good.

In the department of **General Literature** the criticism is animated by the desire to elevate the standard of the public taste, in relation both to artistic perfection and moral purity, and to guide the reader in selecting for himself only those books which are of intrinsic value.

An endeavour is made, by a careful analysis and grouping of each quarter's productions, at once to exhibit the characteristics of the individual works reviewed, and to supply a connected and comparative History of Contemporary Literature.

JOHN CHAPMAN, 8, KING WILLIAM STREET, STRAND.

No. 26. London, 1856.

A

CATALOGUE OF BOOKS,

IN THE VARIOUS BRANCHES OF

The Medical and Surgical Sciences,

(Including the Collections of two Country General Practitioners, deceased, and a portion of the Library of the late Dr. Golding Bird),

Offered at the Prices Affixed, for Cash, by

HENRY KING LEWIS,

15, Gower Street, North, London University College.

Orders, accompanied by a Reference for Payment in London, or by a Post-Office Order made payable in Tottenham Court Road, will meet with immediate attention. Books to the amount of 40s. will be sent, carriage free, to any Railway Station in England.

BOOKS EXCHANGED. LIBRARIES PURCHASED.

New Books, in every department of Literature, supplied at a Discount of Twenty per Cent.

H. K. LEWIS'S CATALOGUE.

Anatomy.

KITANSKY'S PATHOLOGICAL ANAtomy, 4 vols. 8vo cloth, 28s (Syd. Soc. £2 2s)

bini Tabulæ, 28 Sceleti et Musculorum Corporis Humani; Tabulæ 34 Ossium Humani; Tabulæ 7 Uteri Mulieris Gravidæ, et Tabula Vasis Chyliferi, with outline plates, Atlas folio, half mor. £3 3s *Lugd. Bat.* 1747

LBINUS—Explanation of the Anatomical Figures, with an historical account of the Work, 4to 3s 1754

LBINUS Tables of the Skeleton and Muscles of the Human Body, translated from the Latin, plates, imp. fol. hf. bound, £2 *Lond.* 1749

— Historia Musculorum Hominis, plates, 4to. bd. 3s 1733

NATOMICAL plates of the Bones of the Human Body, with letter press descriptions, oblong folio, half bound, 7s 6d

NDRAL'S (G.) Treatise on Pathological Anatomy, translated by Townsend and West, 2 vols. 8vo. 9s Ditto, hf. cf. neat, 12s 1829-31

BAILLIE (Dr. Matthew) Series of Engravings accompanied with Explanations, which are intended to illustrate the Morbid Anatomy of some of the most important parts of the Human Body, 4to, calf, clean copy, £1 15s 1799

—— (Dr. M.) Works, with Life by Wardrop, 2 vols. 8vo. 4s Ditto, half calf neat, 6s 1825

—— Morbid Anatomy of some of the most important parts of the Human Body, 8vo. 1s 6d 1818 Another copy, 1s 1812

—— Morbid Anatomy, by Wardrop, 12mo. 2s 1833

Beclard's General Anatomy, by Knox, 8vo half calf, 2s 1830

BEHR (Dr. A. Von.) Hand Book of Human Anatomy, General, Special, and Topographical, translated and adapted to the English student by Birkett, 12mo. 3s (pub 10s 6d) 1846

BELL C. Engravings of the Arteries, col. plates, royal 8vo. calf, 6s 1801

—— Nervous System of the Human Body, plates, 4to. cloth, 9s 1830

—— System of Dissections plates, fol 3s 6d 1810

—— (J. and C.) Anatomy and Physiology of the Human Body, 3 vols. 8vo. 7s 6d (pub. at £2 12 6d) 1829

—— Bones, Muscles, and Joints, engravings, 4to. 3s 6d 1810

—— Bones, another copy, hf bd, 2s 6d 1794

BIDLOO Anatomia Humani Corporis, centum et quinque tabulis, large folio, calf, gilt edges 24s *Ams.* 1685

Anatomical Remembrancer, 32mo cl. 2s

BROWN (J.) Myographia Nova: or a graphical description of all the Muscles in Humane Body, fol. bd. *plates*, 3s 6d 1697

—— Complete Treatise of the Muscles, plates, fol. bd. 2s 6d 1681

BURNS (A.) Surgical Anatomy of the Head and Neck, cases and engravings, with Life of the Author by Pattison, 8vo. 7s 6d 1824

CARPUE (J. C.) Description of the Muscles of the Human Body, *plates*, 4to. half bd. 1s 6d 1801

CATALOGUE of Preparations in the Museum of St. Thomas's Hospital, Vol. 1. Healthy Anatomy, 8vo 3s 6d 1847

CHESELDEN'S Anatomy, plates, 8vo. bd. 2s 6d 1741

CHEVALIER'S Lectures on the General Structure of the Human Body, and on the anatomy and functions of the Skin, plates, 8vo. 3s 1823

CLOQUET'S Anatomie Descriptive, 2 vols. 12mo sewed, 3s 1822

CLOQUET'S Anatomy, by Knox, 8vo. 4s 1831

COWPER'S Anatomical Tables of the Muscles, 66 plates, large fol. calf, fine copy, 16s 1724

CRAIGIE (Dr. D.) Elements of General and Pathological Anatomy, 8vo. 13s uncut, 1848

—— ditto, 5s 1828

CRONEUS de Ratione Musculorum, sq. 12mo. 1s 1664

CRUVEILHIER'S Traite d'Anatomie Pathologique generale, tome 1, thick 8vo, 4s 6d 1849

—— Descriptive Anatomy by Sharpey, 2 vols. 8vo. 18s 1842

Cyclopædia of Anatomy and Physiology, edited by Todd, Vols. 1 to 4 in parts, £6 15s roy. 8vo. (published at £10 15s) 1836-53

DUBLIN DISSECTOR, or System of Practical Anatomy, by Robert Harrison, M.D. 2 vols. 12mo. 8s 1847 Ditto, 12mo. 3s 1831

EDWARDS (H.) Manual of Surgical Anatomy, translated, with Notes by W. Coulson, 18mo. cloth, 1s 6d 1828

ELLIS (J. V.) Dissector, 12mo. cl. 6s 1849

FYFE'S Compendium of Anatomy. *plates*, 4 vols. 8vo. 4s 1812 Ditto, 4 vols. 6s 1819

GRAINGER (R. D.) on the Spinal Cord, 8vo. cloth. 2s 6d 1837

GREEN'S Dissector's Manual, plates, 8vo 2s

HALLER'S Disputationes Anatomicæ Selectæ, plates, 7 vols. 4to. bd. 21s *Gott.* 1746

—— Icones Anatomicæ Corporis Humani. parts in one vol., fine paper, first impressions of the plates, folio vellum, £3 3s 1743-56

HALLER ad Morborum Historiam, 6 vols. 4to plates, £2 2s *Laus.* 1757-8
HARRISON (Dr. R.) on the Surgical Anatomy of the Arteries, 2 vols. in 1, hf. cf. 3s 6d 1824
Ditto, 3s 6d 1833 Ditto, 4s 1839
— (Dr. J.) on the Nervous System, royal 8vo. 2s 1844
HOLDEN'S Manual of Dissections, Part, 2, 12mo. cloth, 2s
HOPE'S Morbid Anatomy, col. plates, roy. 8vo 38s (pub. at £5 5s) 1834
HOOPER'S Anatomical Plates of the Viscera, 12mo 1s 6d 1803
INNES (John) Anatomical Tables of the Human Body, sm. 4to. *plates*, 1s 6d 1776
MECKEL (J. F.) Manual of General Anatomy, translated by Doane, 12mo. 1s 6d 1837
— Anatomie, Generale, Descriptive et Pathologique par Jourdan et Breschet, 3 vols. 8vo. cloth, 3s 1845
— De Vasis Lymphaticis a Sam. T. Sœmmering, plates, large folio, 12s (pub. at 50fr.) *Leips* 1828
MONEY'S (W.) Vade Mecum of Morbid Anatomy, 250 plates, royal 8vo. 7s 1831
Monro's Anatomy of the Bones, Nerves, &c. 12mo 6d. 1s 1758
— Outlines of Anatomy, 4 vols. 8vo. plates, 4s pub. at £3 3s 1813
— (A.) Structure and Functions of the Nervous System, plates, fol. 4s 1783
Morton (T.) Surgical Anatomy of the Principal Regions of the Human Body, col. plates, roy. 8vo. cloth, 16s 1850
QUAIN (R.) Surgical Anatomy of the Human Body, in 87 drawings, imperial folio, the figures the size of life, drawn from Nature and on Stone, by Joseph Maclise, half morocco, gilt top, with volume of letter-press 8vo. £6 6s 1844
— Another Copy, 2 vols. fol. half mor. gilt top, and Volume of letter press, 8vo. half mor. £6 10s (pub. at £13) 1844
QUAIN (R.) Diseases of the Rectum, 12mo. cloth, 4s (pub. at 7s 6d) 1854
QUAIN'S Elements of Anatomy, edited by R. Quain and Dr. Sharpey, cuts, 2 vols. 8vo cl. 24s (pub. at £2 1848
— Ditto, cuts, 5s 1837
4s, 1834 Ditto, 8vo. half calf, 2s 6d 1832
Quain and Wilson's Anatomical Plates,
The Muscles, folio, half calf, 17s
The Vessels, cloth, 18s Ditto, colored, 33s
The Nerves, 17s Ditto, colored 26s
The Viscera, half calf, 14s
The Arteries, half calf, 12s
REES' Analysis of the Blood and Urine in Health and Disease, and on Urinary Diseases, 8vo cloth 4s 6d 1845
RUYSCHII Observationum Anatomica-Chirurgicarum Centuria, plate, 4to. 2s 6d 1691
STANLEY (E.) Practical Anatomy, 12mo. 1s 6d 1826
SANDIFORT (G.) Tabulæ Anat. Viscerum, Thoracicorum, et Abdominalium, and Ludwig Icones Cavitatem Thoracis et Abdominis, in 1 vol. fol. half calf, 5s 1804
— (E.) Exercitationes Academicæ, 2 vols. *Lugd.* 1783-5, ejusdem Opuscula Academica, *ib.* 1784, in 1 vol. plates, half calf, 4s
SWAN (J.) Nerves of the Human Body, plates, 4to. 15s 1834
— Demonstration of the Nerves of the Human Body, pts. 1 to 3, imp. fol. £2 10s published at £8 8s 1830
THEILE'S Myologie et Angeiologie traduit par Jourdan, 8vo. half calf, 3s 6d 1843
VICQ D'AZYR (F.) Traite d'Anatomie et de Physiologie, Tom. I. (du cerveau) all published, exquisitely col. plates, with duplicates in outline, fol. hf. bd. 34s *Paris* 1786
VOGEL'S Pathological Anatomy, by Day, plates, 8vo. 12s 1847
WALTERI (J. G.) Observationes Anatomicæ, plates, (including the human being with two heads and three feet,) fine paper, fol. half bd. 7s 1775
WILSON'S Anatomist's Vade Mecum, 12mo. 3s 1840 Ditto, 5s 6d 1845
— Practical and Surgical Anatomy, 12mo 3s 1838

Biography.

BARON (Dr. J.) Life of Dr. Jenner, roy. 8vo. 3s 6d 1827
Burder's Memoir of Dr. T. Burder, pt. 8vo 2s
CLARKE (Dr. Jos.) Life and Writings, edited by Collins, 8vo cloth, 2s 6d 1849
COMBE (Dr.) Life and Correspondence of Dr. Andrew Combe, *portrait*, 8vo. 6s 1850
CURRIE'S Memoirs of Dr. James Currie, 2 vols. 8vo. 6s 1831
FERGUSSON'S Notes and Recollections of a Professional Life, by his son, 8vo. cl. 3s 1846
GREGORY (Dr. O.) Memoirs of Dr. J. M. Good, 8vo. 2s 6d 1828
MACKNESS Memorials of, edited by Author of "Bampton Rectory," 12mo. cl. 3s 1851

Botany.

BURNETT (G) Outlines of Botany, 8vo. 6s 6d (pub. at 21s) 1835
BALL (S.) Cultivation and Manufacture of Tea in China, plates. 8vo cloth 6s (pub. 14s) 1848
GRAY (Dr. Asa) Botanical Text Book, 1200 engravings, 8vo. 6s 1850
GERARDE'S Herball, or General History of Plants, enlarged by Johnson, fol. bd. 30s 1633
HILL (Sir J. M.D.) Family Herbal, col. plates 8vo. bd. 4s 1812
HOOKER'S British Flora, 8vo hf. cf. 3s 1830
JOHN'S (Dr. W.) Practical Botany, 8vo. 1s 6d
LINDLEY'S Glossary of Technical Terms used in Botany, 8vo. cloth, 3s 6d 1848
— Introduction to Botany, 8vo. 5s 1839
— Key to Structural, Physiological, and Systematic Botany, 8vo. cloth, 1s 1839

MACREIGHT (D.) Manual of British Botany, 12mo cloth, 4s 1837

PONTEDROE (Julii) Compendium Tabularum Botanicarum, 4to. bds. 2s 1718

SCHACHT on the Microscope applied to Vegetable Anatomy and Physiology, cuts, 12mo 3s 1853

SCHLEIDEN'S Principles of Scientific Botany, by Lankester, illustrated, 8vo cl. 12s 1849

Smith (Sir James Edward) Introduction to Physiological and Systematical Botany, 12mo. cloth, 3s 6d pub. at 9s 1836

STEPHENSON and Churchill's Medical Botany, Edited by Burnett, coloured plates, 3 vols. roy. 8vo. £2 10s 1834-6

WHEELER'S (J.) Catalogus Rationalis Plantarum Medicinalium in Horte Societatis Pharmaceuticæ Londinensis, 8vo. 1s 1830

WITHERING'S (W.) British Plants, 4 vols. 8vo. plates, 7th (latest) edit. 21s. published at £2 16s 1830

—— Foxglove, and its Medicinal uses, colored plate, 8vo. cloth, 1s 6d 1785

Brain, Insanity, &c.

Abercrombie's Diseases of the Brain and Spinal Cord, 12mo, 2s 1834

ADAIR (J.) Philosophical and Medical Sketch of the Natural History of Mind, 8vo. 2s 1787

ALLEN (Dr. W.) Classification of the Insane, 8vo. plates, 5s 6d

—— Cases of Insanity, Vol. 1. part 1, 8vo. 2s 6d 1831

BADELEY (Dr. J. C.) Mind and Matter, and Insanity, roy. 8vo. sewed, 1s 6d 1851

[B]URROWS (Dr. G.) Disorders of the Cerebral Circulation, &c. col. plates, 8vo. cl. 6s 1846

[CHE]YNE (Dr. G.) English Malady, a Treatise [of Ner]vous Diseases, 8vo. bd. 2s 1736

—— Method of Curing the Diseases of the Body [and] Disorders of the Mind, 8vo. bd. 2s 1742

—— Hydrocephalus Acutus, imp. 8vo 2s 1808

—— Acute Hydrocephalus, 8vo. 4s (pub. 1840

BEHR (Dr. A. W. C.) Insanity, 8vo 3s 1838

—— and Broussais's Functions of the ... translated by G. Combe, 8vo hf cf 3s 1838

—— Influence of Mind over the Body, (B... ze) 12mo cl. 1s 6d 1855

—— (J.) Madness and Melancholy, 8vo. 1809

—— (R.) Morbid Anatomy of the Human ... illustrated by colored engravings of its frequent and important Diseases, 4to 1828

[JOUR]NAL of Psychological Medicine, Nos. 5, ... and 20 each 2s, 25 to 31 at 2s 6d 1854

[JU]SSIEU'S Elements of Botany, translated by J. H. Wilson, F.R.B.S. 12mo. cloth, 5s 1849

MILLINGEN'S (Dr.) The Passions: or Mind and Matter, 8vo. cloth, 5s 1848

—— (Dr. J. G.) Aphorisms on Insanity, 18mo. cloth, 2s 1840

GRIFFITH (W.) Hydrocephalus, 8vo 1s 18

MORISON (Dr. A.) Lectures on Mental D[is]eases, 13 plates, 8vo 4s 18

Monro's Morbid Anatomy of the Brain. Hyd[ro]cephalus, plates, 8vo. 1s 6d 18

Philip's Affections of the Brain, 12mo 1s 6d 18

POOLE (Dr. R.) Royal Lunatic Asylu[m], Infirmary, and Dispensary of Montrose, 8[vo] cloth, 1s 6d (pub. at 8s) 18

PRICHARD (Dr. J. C.) Insanity, 8vo. 8s 18

Quin (Dr. C) Dropsy of the Brain, 8vo 1s 17

RAY'S Medical Jurisprudence of Insanity [by] Spillan, 12mo. cloth, 1s 6d 18

ROWLAND (Dr. R.) Nature and Treatme[nt] of Softening of the Brain, 8vo cloth, 1s 18

SEYMOUR (Dr. E. J.) Medical Treatment [of] Insanity, 8vo. 2s 18

SOLLY (S.) on the Human Brain, plates, 8[vo] 5s 6d 18

SPURZHEIM'S (Dr. J. G.) Physiognomic System of Drs. Gall and Spurzheim, imp. 8[vo] plates, 7s pub. at 30s 18

—— Ditto, 12mo. plate, 1s 18

—— Anatomy of the Brain, by Willis, plat[es] 8vo 6s (pub. at 21s) 18

STEWARD (Dr. J. B.) Practical Notes [on] Insanity, 8vo. 2s 6d 18

SYER (J.) on Insanity, 8vo. 3s 18

WILLIAMS (Dr. J.) Insanity, 8vo cl 6s 18

WINSLOW'S (Forbes) Act for the Regulati[on] of the Care and Treatment of Lunatics, wi[th] Notes and Comments, 12mo. 3s 18

—— Anatomy of Suicide, 8vo. cloth, 4s (pub. at 14s) 18

Chemistry.

ANNALEN der Chemie und Pharmacie, h[e]rausgegeben Wohler und Liebig, Band 57 [to] 68, in 6 vols half calf, 10s 6d 1846

BOWMAN'S Practical Chemistry, 12mo. clo[th] 3s 18

BRANDE (W. T.) Manual of— 2 vols 8vo 2[s] (pub. at £2 5s) 1848 Ditto. 7s 18

CAMPBELL (Dug.) Text Book of Inorgan[ic] Chemistry, 12mo. 3s (pub. at 5s 6d) 18

DANIELL'S (J. F.) Introduction to Chemic[al] Philosophy, 8vo. cloth, 15s 18

FOURCROY'S (A. F.) Elements of Chemistr[y] and Natural History, 3 vols. royal 8vo. ha[lf] bound, 3s 180

—— General System of Chemical Knowledg[e] by Nicholson, 11 vols. 8vo. half bd. 7s 180

FRESENIUS' Chemical Analysis. Qualitativ[e] By Liebig and Bullock, 8vo. cloth, 5s 185

Fownes's Chemistry as exemplifying the Wis[dom] and Beneficence of God, 12mo. 3s 6d 18

GALLOWAY'S First Step in Chemistry, 8vo 2s 185

GMELIN (L.) Handbuch der Chimie, ... vols. (Vols. 1 to 4, half calf neat,) £1 12[s] *Heidelb.* 1843

GRAHAM'S Elements of Chemistry, 8vo, 6s 1842 Ditto, Vol 1, hf. cf. 14s 1850
GREGORY (Dr. W.) Outlines of Chemistry, 12mo cl. 3s 6d 1847
GRIFFITHS (P.) Chemistry of the Four Seasons, 12mo. 5s 6d 1853
HENRY's Experimental Chemistry, plates, 2 vols 8vo 3s 1829
Lehmann's Handbuch der Physiologischen Chemie, roy. 8vo 3s 1854
Lavoisier's Chemistry, by Kerr, 8vo bd 1s 1793
LIEBIG's Animal Chemistry by Gregory, pt. i 8vo cloth, 4s 1846
—— Motion of the Juices in the Animal Body, by Gregory, 8vo cl. 3s 1848
LOW (D.) Inquiry into the Nature of the Simple Bodies of Chemistry, 2nd edit. 8vo. 5s 1848
LOWIG's Organic and Physiological Chemistry by Breed, roy. 8vo cl. 7s 1853
MULDER (G) Chemistry of Vegetable and Animal Physiology, by Fromberg and Johnstone, 4 parts, col plates, 8vo. 18s (pub. at 32s) 1849
—— ditto, half calf neat, 20s 1849
PROUT (Dr. W.) Chemistry, Meteorolgy, and the Function of Digestion, 8vo. cloth, 4s 1845
RASPAIL'S Systeme de Chimie Organique, 3 vols. 8vo. with atlas of Plates, coloured and plain, 5s 1838
Richardson (W.) Chemical Principles of the Metallic Arts, 8vo. 1s 6d 1790
REID's (Dr. D.) Elements of Chemistry, theoretical and pratical, cuts, 8vo hf. calf, 4s 1839
ROYAL College of Chemistry—Reports and Researches conducted in the Laboratory in the Year, 1845-6-7, 8vo. 3s 1849
Solly (E.) Syllabus of a complete course of Lectures on Chemistry, including its application to Arts, Agriculture, and Mining, interleaved, 8vo. 3s 6d 1849
ROSE's Traite Pratique d'Analyse Chimique, par Jourdan, 2 vols. 8vo cloth, 5s 1843
THOMSON'S Chemistry of Animal Bodies, 8vo cloth, 3s 6d 1843
VIOLETTE et Archambault Dictionaire des Analyses Chimiques, 2 vols. 8vo. 9s *Par.* 1851

Cutaneous Diseases.

BATEMAN and WILLAN'S Delineations of Cutaneous Diseases, col. plates, 4to. half mor. gilt top £3 6s (pub. £12 12s) 1840
BATEMAN (Dr. T.) Cutaneous Diseases, 8vo. hf. calf, 1s 1817
—— Another Copy, 2s *coloured plates* 1819
—— Another Copy, 8vo. col. plates, edited by Thomson, 4s 1829
BELLIOL (Dr.) Traites des Maladies Chroniques.—Description et traitement des maladies de la peau (Lartres; Teigne; Scrofules, Ulceres, Cancer, Syphilis, port.) 8vo. 3s 1841
BURGESS (Dr. T. H.) Eruptions of the Face, Head, and Hands, col. plates, 8vo. cl. 9s 1849
Cazenave's Diseases of the Hair, by Burgess, 12mo cl. 1s 6d 1851
GREEN (Dr. J.) Diseases of the Skin, colored plates, 8vo. 4s 1837
HUNT (Dr. T.) Pathology and Treatment of certain Diseases of the Skin, 8vo. 3s 6d 1847
PLUMBE (S.) on Diseases of the Skin, colored plates, 8vo. 3s 6d 1827
—— Another Copy, 8vo. plates, 5s 1837
—— on Porrigo, col. plates, 8vo 1s 6d 1821
RAYER (P.) Traite des Maladies de la Peau, 3 vols. 8vo. with Atlas of col. plates, 4to. £2 10s 1835
—— Treatise on Diseases of the Skin, 8vo. with Atlas of col. plates, 4to. £1 16s 1835
STRUVE (L. A.) Synopsis Morborum Cutaneorum, Latine et Germanice, col. plates, fol. 13s *Berlin* 1829
THOMSON Dr. A. T.) Practical Treatise on Diseases affecting the Skin, completed and edited by Dr. Parkes, 8vo cloth, 8s 1850
WILLAN on Porrigo and Impetigo, edited by Ashley Smith, col. plates, 4to. 2s 6d 1814
—— (Dr. R.) Miscellaneous Works, edited by Ashby Smith, 8vo. 2s 6d 1842

Dentistry.

BELL (T.) Anatomy, Physiology, and Diseases of the Teeth, plates, 8vo. 6s 6d 1835
—— Another copy, 5s 1829
BOND (Dr. T. E.) Practical Treatise on Dental Medicine, 8vo. bd. 8s (pub. 14s) *Phil.* 1852
CANTON (A) Teeth and their Preservation, in Infancy to Old Age, 12mo cloth 3s 1851
CLARKE (J. P.) Odontalgist, plates, post 8vo. cloth, 3s 1854
—— (J. P.) Treatment of Teeth, 8vo. 2s 1829
EUSTACHIUS de Dentibus, am. 4to. 1s 6d 1563
FOX (J.) on the Teeth, 2 vols. plates, 4to. 10s 1806 Another copy, 4s 6d 1803
HAYWARD (H.) on the Teeth, 8vo. 1s 1847
HOWARD on Loss of Teeth, &c. 12mo 1s 1854
KOECKER on the Diseases of the Jaws by Mitchell, 8vo. 3s 1848
—— Dental Surgery, 8vo 2s 1826
NASMYTH (A.) on the Development and Structure of the Teeth and Epithelium, 8vo. col. plates, 2s 6d 1841
—— Researches on the Development, Structure, and Diseases of the Teeth, plates, 8vo. 4s 1839
Robertson (W.) Human Teeth, plates. 8vo. 5s 1842
ROUSSEAU (L. F. E.) Anatomie Comparee du Systeme Dentaire chez l'Homme et chez les principaux Animaux, plates, calf gilt, 16s *Paris* 1827

Jurisprudence.

BECK (Dr. J.) Medical Jurisprudence, 8vo. 5s 1838 Ditto, latest edition, 12s 1842
GUY (A. B.) Principles of Forensic Medicine, 12mo. cl. 7s 1844
MALE'S (Dr. G.) Forensic Medicine, 8vo. 1s 1816
RYAN (M.) Medical Jurisprudence, 4s 1836

SMITH'S (J. G.) Principles of Forensic Medicine, 8vo. 3s 1827
TAYLOR'S (A. S.) Medical Jurisprudence, 12mo. cloth, 7s 1852

Medicine.

Abercrombie's Diseases of the Stomach, 8vo 2s 6d 1830
ADDISON (Dr. W.) Healthy and Diseased Structure, and True Principles of Treatment, especially of Consumption and Scrofula, plates, 8vo cloth, 7s 1849
AIKIN (C. R.) on Cow Pox, coloured plates, 18mo. half calf, 1s 6d, ditto bds. 1s 1801
ANCELL (H.) Tuberculosis, the constitutional origin of Consumption & Scrofula, 8vo 15s 1852
ANDERSON (W. J.) Nervous Diseases, 8vo. cloth, 3s 1850
ANDRALL'S Clinique Medicale, by Spillan, 8vo 12s 1835
ARAN (F.) Disease of the Heart and Great Vessels, translated from the French, by Dr. Harris, 12mo. 2s *Phil.* 1833
ARMSTRONG (Dr. J.) on Typhus Fever, and other Febrile and Inflammatory Diseases, 8vo. 2s 6d 1819
—— on Scarlet Fever, Measles, and Pulmonary Consumption, 8vo. 2s 6d 1818
—— Lectures on Acute and Chronic Diseases, 8vo. half calf, 7s 1834
ARNOTT (J.) on Indigestion, 8vo. cl. 1s 6d
ASSALINI on Plague, Dysentery and Opthalmy of Egypt, translated from the French by Neale, 12mo 1s 6d 1804
AURELIANI de Morbis Acutis et Chronicis, 4to. bd. 3s 1758 Ditto, 2s 6d 1722
AVICENNA Opera Medica, a Costeo, 2 vols. fol. bd. 21s *Ven.* 1608
—— ditto, fol. bd. 28s *Venet.* 1564
AYRE (J.) Malignant Cholera, 8vo. 2s 1833
AYRE (Dr. J.) on Dropsy, 8vo. 2s 1829
BAIRD (G.) de Hepatitide, 8vo. hf. cf. 1s 1823
Bampfield (R.) Tropical Dysentery, 8vo 2s 1832
BARDSLEY'S (Dr. J. L.) Hospital facts and observations, 8vo. 2s 6d 1830
—— (Dr. S. A.) Medical Reports with an enquiry into the origin of Canine Madness, 8vo half bd. 2s 1807
BARROUGH (P.) The Method of Physick, conteining the causes, signs, and cures of inward diseases in man's bodie from the heade to the foote, sm. 4to. bd. 2s 6d 1609
BARTH and Roger on Auscultation by Newbiggin, 12mo. 3s 6d 1842
BEASLEY'S (.) Book of Prescriptions, 18mo. cloth 4s 6d 1854
BEAUPRE on the Effects and Properties of Cold, with a Sketch Historical and Medical of the Russian Campaign, translated by Clendinning, 8vo. 3s 1826
BELL (G. H.) on Cholera, 8vo. 1s 6d 1832
—— Diseases of British Officers, Soldiers, and others in the West Indies, 8vo. 2s 1791

BELLINGHAM (Dr. O'B.) Diseases of the Heart, 8vo cloth 4s 1853
BENNETT (Dr. J. H.) Pulmonary Tuberculosis, 8vo cloth 4s 1853
BILLING (Dr.) Diseases of the Lungs and Heart, 8vo. 4s 1852
—— Principles of Medicine, 8vo. 3s 1841
—— ditto, 7s 1849
BLACK'S (Dr. F.) Principles and Practice of Homeopathy, roy. 8vo. 4s 6d pub. at 9s 1842
BLACKALL (Dr. J.) On the Nature and Cure of Dropsies, 8vo. half calf, 2s 1824
BLANE (Sir G.) Elements of Medical Logic, 8vo. hf. cf. neat, 3s 6d 182[illegible]
—— Select Dissertations on several subjects of Medical Science, 8vo. hf. calf neat, 2s 6d 182[illegible]
BLASII Medicina Universa, sm. 4to bd. 2s 165[illegible]
BLUNDELL (Dr. J.) Medicina Mechanica, 8vo. 3s 185[illegible]
—— (Dr. E. S.) Sphygmometer, 8vo. 1s 185[illegible]
BOERHAAVE'S Medical Correspondence, 8vo. bd. 1s 6d 174[illegible]
BOISSEAU'S Nosographie Organique, 4 vols. bd. 3s 182[illegible]
BOUILLAUD (J.) Nosographie Medicale, 5 vols. 8vo. half calf neat, 20s 184[illegible]
BREE (Dr. R.) Disordered Respiration, 8vo. bd. 1s 6d 180[illegible]
Broussais Annales de la Medicine Physiologique, 3 vols. 8vo half bound, 3s 182[illegible]
BROWN (J. B.) Scarlatina and its treatment, 8vo. 2s 184[illegible]
BRUEL (Walter) Praxis Medicinæ: or the Physician's Practice, sm. 4to. bd. 4s 163[illegible]
BUDD (Dr. G.) Diseases of the Liver 12s 185[illegible]
BURNET (T.) Thesaurus Medicinæ Practicæ, 4to. bd. 2s 6d 169[illegible]
BURNE (Dr. J.) On Typhus, or Adynamic Fever, 8vo. half calf, 2s ditto, bds. 1s 6d 182[illegible]
BURNS (A.) on the Heart, 8vo. 1s 6d 180[illegible]
—— ditto and Saunders on the Liver, 1 vol 2s 6d
BURSLEM (Dr. W. M.) Pulmonary Consumption, 8vo. cloth, 3s 6d 185[illegible]
CAMPBELL'S (J.) Observations on Tuberculous Consumption coloured plates, 8vo. 2s 6d (pub. at 12s) 1841
CARTER (R. B.) Pathology and Treatment of Hysteria, 8vo cloth, 3s 1853
Celsus Literally translated by Collier, 32mo. cl. 2s 1830 Ditto, 12mo. half calf, 3s 1831
—— Latin and English, 2 vols. 12mo. cloth 5s 1815
—— ed. Milligen, 8vo hf. cf. neat 5s 1831
CHESNEAU, Observationum Medicarum, 4to bd. 3s *Lugd. Bat.* 1719
CHILD (Dr. G. C.) on Indigestion 8vo. 3s 1847
CHISHOLM (Dr. C.) Malignant Pestilential Fever in the West Indian Islands, 8vo. bd. 2s 6d 1795
CHRISTIE (A. T.) on the Nature and Treatment of Cholera, 8vo. bds. 1s 6d 1828
CLARE (P.) Cure of Abscesses by Caustic, and on Wounds and Ulcers, 8vo. 1s 1779

CHRISTISON (Dr. R.) on Poisons, 8vo. 1s 6d 1832 Ditto, 2s 6d, 1835 Ditto, 8s 1845
—— Granular Degeneration of the Kidnies, 8vo. 3s 1839
CLARKE (Dr. E. G.) Practice of Physic, 8vo 1s 6d 1811
—— (Dr. John) on Fevers, 8vo. bd. 1s 6d 1780
—— (Dr. G. A.) British Physician, 12mo bd. 1s 1750
COLBATCH (J.) on Gout, 12mo. bd. 1s 1698
CORMACK (Dr. J. R.) Epidemic Fever 2s 1843
COOKE (W.) On the Sources and Effects of derangement of the digestive organs, 8vo. half calf neat, 2s 1828
COPLAND'S Dictionary of Practical Medicine, Parts 1 to 16, £3
COPLAND'S Dictionary of Practical Medicine, Parts 1 to 6, 14s pub. at £2 5s
COTTON (Dr R P) Consumption 8vo 4s 1852
COURVISART (Dr. J. N.) on the Heart, by Hebb, 8vo. 3s 1813
CRAIGIE'S Elements of the Practice of Physic, Vol. 1. (Fevers and Inflamations) 4s 1836
CULLEN'S (W.) Practice of Physic, 2 vols 8vo. 6s 6d 1829 ditto 3s 6d 1816
—— Ditto, 4 vols. 3s 1789
—— Materia Medica, 2 vols. 4to. clf gilt, 4s 1789
—— ditto, 4to. bd. 2s 1773
CURRIE (Dr. J.) Medical Reports 2 vols 8vo. 3s 1805
Cyclopædia of Practical Medicine, edited by Forbes, Tweedie, and Conolly, 4 vols. roy. 8vo. cloth, £2 15s (pub. £6 15s) 1833-5
DAVIES (Dr. T.) Diseases of the Lungs and Heart, 8vo 3s 1835
DAWSON (Dr. R.) Spermatorrhœa and Urinary Deposits, 12mo. 2s Ditto, 2s 6d 1851
DAWSON (D G. P.) Nosological Practice of Physic, 8vo. 2s 1824
DICTIONNAIRE des Etudes Medicales Practiques, par Andral, Boivin, &c. &c. 4 vols. half cloth, 5s 1838-9
—— de Medicine par Adelon, Andral, Beclard, &c., 21 vols. 8vo. half calf neat, 28s 1821-8
DIEU (S.) Traite de Matiere Medicale et de Therapeutique, 3 vols. 8vo. 12s *Paris* 1847-8
DIOSCORIDES Opera Omnia, Gr. et Lat. fol. bd. 12s 1598
—— Commentaire par Matthiolus, fol. cuts, 10s 6d 1579
DUNCAN (Dr. A.) Three Species of Pulmonary Consumption, 8vo. 1s 1814
—— Medical Cases and Observations, 8vo. 1s 6d 1778
DUNGLISSON'S Practice of Medicine, a treatise on Special Pathology and Therapeutics, 2 vols, royal 8vo. 6s 1844
—— Dictionary of Medical Science; containing a concise explanation of subjects and terms; with the French and other synonymes; notices of Climate and celebrated mineral waters; &c. (seventh edition, revised and enlarged,) royal 8vo. 8s 1851
ELLIOTSON (Dr. J.) Principles and Practice of Medicine, by Rogers, 8vo. 9s 1839
—— Art of distinguishing various diseases of the heart, plates, folio, 7s (pub. at 21s) 1830
FLEMING (Dr. A.) Aconitum-Napellus, 8vo. cloth, 2s 6d 1845
FARR on Scrofula and Russell on Scrofula, in one vol. 8vo 1s 1820-8
FORDYCE (Dr. G.) on Fevers, 2 vols. 8vo. half bound, 6s 1795-7
FORDYCE (Dr. G.) on Fevers, containing his last Dissertation, 2 vols. 8s 1795-1802
—— On the Digestion of Food, 8vo. 1s 1791
— Five Dissertations on Fever, 3 vols. half vellum, 9s 1800-3
FREIND (J.) Opera Omnia Medicina, port. fol. bd. clean copy, 8s 1733
GARNER'S Eutherapeia: or, an Examination of the Principles of Medical Science, with Researches in the Nervous System, plates, 8vo cloth 5s 1255
GILBERT (H.) Pulmonary Consumption, 8vo. cloth, 3s 1847
GOOD'S (J. M.) Study of Medicine, edited by Samuel Cooper, 5 vols, 8vo. 10s 1829
—— Ditto, 4 vols. 8vo. 16s 1834
GRAHAM (T. J.) Modern Domestic Medicine, 8vo. 9s (pub. at 16s) 1848
—— Stomach and Liver, 8vo. 1s 6d 1824
GIBB (Dr. G.) Hooping Cough, 12mo 5s 1854
GRAVES'S Clinical Medicine, 8vo 6s 1843
GREGORY'S Conspectus, translated, 8vo. 4s
—— Ditto, bd. 6s 1823
—— Lectures on the Duties and Qualifications of a Physician, 8vo. bd. 2s 1772
HAHNEMANN'S Homeopathy by Devrient and Stratten, 8vo. 2s 6d 1833
HALL'S Principles of Medicine, 8vo. 6s 1837
HALL (Dr. M.) on the Mimoses, 8vo 2s 1818
—— Morbid and Curative Effects of Loss of Blood, 8vo. 3s 1830
HAMETT (Dr. J.) Cholera at Dantzick, 8vo cloth, 2s 6d 1832
HAMILTON (Dr. W.) History of Medicine, 2 vols. 8vo. 7s 1831
—— on Purgative Medicines, 8vo. 2s 1823
—— Ditto, 8vo. bd. 1s 1806
—— (Dr. R.) on Scrofulous Affections, 12mo. 1s 1791
HARTY (W.) Dysentery, 8vo. 1s
HARVEY (W.) Rheumatism, Gout and Neuralgia, as affecting the Head and Ear, 8vo cl. 2s 6d 1852
HAWKINS (Dr. F.) Rheumatism and some Diseases of the Heart, &c. 8vo. 1s 1826
—— Medical Statistics, 8vo. 2s 1829
HEADLAND'S Action of Medicines, 8vo cl. 4s 6d 1852
HEBERDEN'S (Dr. W.) Commentaries on the History and Cure of Diseases, 8vo. bd. 3s 1802
HOLLAND (Dr. H.) Medical Notes and Reflections, 8vo. cloth, 5s 1839 Ditto, 7s 1840

HOPE's Diseases of the Heart and Great Vessels, plates, 8vo. 3rd. edition, 5s 1839
HOOPER'S Physician's Vade Mecum by Guy, 12mo. 3s 6d 1842 ditto, 7s 1854
—— Medical Dictionary, 8vo 4s 6d 1831
HULL (Dr. R.) Essays on Determination of Blood to the Head, 8vo. cloth, 2s 6d 1842
HUNTER'S Medical Commentaries, Introductory Lectures, and Cruikshank on the Absorbents, 1 vol. 4to. calf, 4s 1777
JONES (Dr. B.) Gravel, Calculus and Gout, 8vo. cloth, 3s 1842
LAENNEC on Diseases of the Chest, by Dr. J. Forbes, plates, 8vo. 7s (pub. at 18s) 1834
—— Ditto, by Herbert and Ramadge, plates, 8vo. 9s 1846
—— Traite de L'Auscultation Mediate et des Maladies des Poumons et du Cœur, 2 vols. 8vo. plates, 4s 1826
LARGI (Scribonii) Compositiones Medicæ, recens Rhodius, plates, 4to. bd. 3s *Pat.* 1655
LA ROCHE (R.) Pneumonia: its supposed connection Pathological and Etiological, with Autumnal Fevers, and on Malaria, 8vo. cloth 13s (pub. at 18s) *Phil.* 1854
Latham's Diseases of the Heart, 2 vols 12s 1846
LIBRARY OF MEDICINE, edited by Dr. Tweedie, 8 vols. post 8vo £2 15s (pub. at £4 19s) 1841
Lloyd (E A) on Scrophula, 8vo 1s 6d 1821
Lobb on Fevers, 8vo bd. 1s 6d 1735
—— on Stone and Gout, 8vo bd. 1s 1739
LUGOL sur les Causes des Maladies Scrofuleuses, translated by Ranking, 8vo. cl. 4s 1844
MACBRIDE (Dr. D.) Introduction to the Theory and Practice of Physic, 4to. bd. 2s 6d 1772
M'CORMAC (Dr. H.) Nature, Treatment and Prevention of Continued Fever, 8vo. 2s 1835
MACLEOD (Dr. R.) Rheumatism, 8vo. 3s 1842
MACKINTOSH'S Practice of Physic, 2 vols. 8vo. 6s 6d 1836 ditto, 2 vol. 4s 6d 1832
Madden (Dr. H. R.) Homeopathy and Medical Reform, 12mo. 1s 1846
MEDICAL Communications, plates, vol. I. 8vo. half calf, 1s 6d 1789
—— Observations and Inquiries. By a Society of Physicians in London, plates, 6 vols. 8vo. bd. 9s 1758-81
—— Extracts, col. plates, 4 vols 8vo bd 4s 1796
MINADOUS, de Variolis, sm. 4to. 1s 6d 1603
Monro (D.) on Dropsy, 8vo. bds. 1s 6d 1765
—— Different kinds of Small Pox, especially that which follows vaccination, col. plates, 8vo. 2s 6d 1818
Moore's History of Small Pox, 8vo. 2s 1815
MORTON Phthisiologia, 12mo. vellum, 2s 1689
MOTHERBY'S Medical Dictionary, plates, fol. bd. 5s (wants title)
NEALE (St. John) *Remarks on Tabes Dorsalis* 8vo. cloth, 1s 6d 1806
—— (Dr. A.) Ergot of Rye, 8vo 1s. (pub. at 4s 6d) 1828

PARR'S (Dr. B.) London Medical Dictionary, including Anatomy, Physiology and Pathology, Physic and Surgery, Therapeutics and Materia Medica, with whatever relates to Medicine in Natural Philosophy, Chemistry, and Natural History, *plates*, 3 vols. 4to. half bd. 8s 1809
——Another Copy, 6s 6d 1809
PEMBERTON (Dr. C. R.) Diseases of the Abdominal Viscera, plates, roy. 8vo. bd. 2s 1814
—— ditto, and Farre's Malformations of the Human Heart, plates, 1814 in 1 vol. hf. cf. 3s
PERCIVAL'S (Dr. T.) Medical Ethics, 12mo. bd. 1s 1803
——(E.) Typhus Fever, 8vo. 1s 6d 1819
Parkin (J.) Antidotal Treatment of Epidemic Cholera, 8vo 1s 6d 1836
PHILIP (Dr. A. P. W.) on Protracted Indigestion, and its Consequences, 8vo. 2s 1842
—— on the Means of Preserving Health, and, particularly, the prevention of Organic Diseases, 8vo. 3s 1830
—— on Inflammation, 8vo. 1s 6d 1833
—— on Symptomatic Fevers, 8vo 2s 1820
PHILIPS (B.) Scrofula, its nature and treatment, plates, 8vo. 6s 1846
PISONIS de Cognoscendis et Curandis humani corporis morbis ed. Boerhaave, 2 vols. 4to. bd. 2s 6d 1736
PROUT (W) Stomach and Renal Diseases, 8vo cloth, uncut, 18s 1846
—— ditto, 7s 1843
RANCHINI Opuscula Medica, 4to. bd. 1s 6d *Lugd.* 1627
READ (Dr. A.) Workes of that famous Physitian, sm. 4to. bd. 3s. 1650
REID Dr. W. Practice of Medicine, 8vo. 5s 1839
RING (J.) on the Cow Pox, plates, 3 vols. 8vo bd. 9s 1801-4
—— on Gout, 8vo. 1811 and Hamilton (Dr. J.) on Mercury, 8vo. 1 vol, half calf, 2s 1829
ROBERTSON (W. H.) on the Nature and Treatment of Gout, 8vo. 7s 1845
—— Diet and Regimen, 2 vols. 8vo. 7s 1848
ROLLO's (Dr. J) cases of the Diabetes Mellitus, 8vo, 1s 1798
ROSTAN (L.) Exposition des Principes de l'Organicisme, 8vo. 2s 1846
RUCCO (Dr. J.) Science of the Pulse, as applied to the practice of Medicine, 2 vols. imp. 8vo. half calf neat, 6s Ditto, bds. 3s 1827
RUSSELL (Dr. P.) on the Plague, 4to. calf, 6s 1791
RYLAND (F.) Diseases and Injuries of the Larynx and Trachea, col. plates, 8vo. 3s 1837
Saunders (Dr W) on the Liver, and the Hepatitis of India, 8vo. 2s. 1809
SCUDAMORE (Dr. C.) on Gout and Rheumatism, &c. 8vo. 3s 1817
—— Medical Visit to Grafenberg, 8vo. 1s 6d
—— Essay on the Blood, 8vo. 1s 1824

Shearman (Dr. E. J.) Detection and Treatment of some Diseases of the Chest, plates, 8vo 1s 6d 1848
SHUTE'S Principles of Medical Science and Practice, 2 vols. 8vo, 6s 1826
SKIER'S (Dr. E.) Treatment of Diarrhœa, Dysentery and Cholera, 8vo. 1s 1849
Smith (Dr S) on Fever, 8vo. 3s (pub. at 14s) 1830
SKRIMSHIRE (Dr. F.) Village Pastor's Surgical and Medical Guide, 8vo cl. 2s 6d 1838
STEVENS (Dr. W.) on Healthy and Diseased Blood, 8vo. half calf, 3s 1832
—— on Asiatic Cholera, 8s 1853
STEVENSON (J.) on Deafness, illustrated by cases, 12mo. 1s 6d 1839
STONE (Dr. A. D.) Diseases of the Stomach, 8vo. bd. 1s 6d 1806
STROTHER (Dr. E.) Criticon Febrium, 8vo. bd. 1s 6d 1718
SUTTON (Dr. T.) Delirium Tremens, &c., 8vo. bd. 1s 6d 1813
SUTHERLAND (Dr. A.) Attempts to revive Ancient Medical Doctrines, two vols. in one, 8vo. half bd. 2s 1763
SUTRO (Dr. T.) Lectures on the German Mineral Waters, 12mo. 4s 6d 1851
SWAN (J.) Treatment of the Nerves, plates, col. and plain, 8vo. 3s 6d 1820
SYDENHAM Opera, 12mo bds. 2s 1827
—— Works, by Swan, 8vo bd 3s 1753
—— ditto, by Pechey, 8vo bd. 2s 1713
Sanctorius' Medicina Statica by Quincy, 8vo bd 1s 6d 1728
VENABLES (R.) on Dropsies, 8vo. 1s 6d 1824
WALL (Dr. J.) Medical Tracts, 8vo. 2s 1780
WALSHE (W. H.) Diseases of the Lungs and Heart, 8vo. 5s 1851
—— Diseases of the Lungs, 12mo. 2s 1843
WATT (R.) Cases of Diabetes, Consumption, &c. 8vo. 2s 1808
Webster (Dr. J.) Epidemic Cholera, 8vo. 1s 6d 1832
WEGG'S (Dr.) Observations relating to the Science and Art of Medicine, 8vo. 4s 1851
WHITEHEAD (Dr. J.) on Hereditary Diseases, 8vo. 7s 1851
WHYTT (Dr. R.) Nervous Disorders, 8vo bd 1s 6d 1765
WHAT TO OBSERVE at the Bedside and after Death, 12mo cloth, 3s 6d 1854
WILLIAMS (Dr. J. C. B.) Principles of Medicine, 8vo. 2nd. edition, 6s 1848
—— ditto, 8vo. 3s 1843
—— Diseases of the Chest, 8vo. 3s 1835
—— (Dr. E.) Tongue in derangement of the Stomach and Bowels, 8vo. cloth, 2s 1843
WILSON (Dr. A.) Action of Morbid Sympathies, 8vo. 2s 1818
—— (Dr. A. P.) Febrile Diseases, 4 vols. 8vo. 6s 1803-4
—— (Dr. A. P.) Nature of Fever, 8vo. 1s 1807
—— (Dr. J.) West Indian Fever, 8vo. 2s 1827
WILLIS'S Practice of Physick, being the whole works of that renowned and famous Physician; plates, sm. folio, bd. 5s 1684
WILLIS (Thomæ) Opera omnia, 4to vellum, 5s 1782
YEOMAN (Dr. T.) Consumption, 12mo 1s 1848
YOUNG'S (S.) Cases of Cancer and successful treatment, 8vo. 1s 1815
—— (Dr. S.) on Cancer: and mode of Curing by natural Separation, 8vo. 1s 6d 1805

Midwifery.

BLUNDELL (Dr. J.) Principles and Practice of Midwifery by Severn, 12mo hf. cf. 3s 1839
BURNS (J.) Principles of Midwifery, 8vo. 1s 1820 Ditto, 2s 1828
CHURCHILL's Manual of Midwifery, 12mo. cloth, 6s 1850 Ditto, 4s 1842
COCK'S (Dr. F.) Manual of Obstetrics, post 8vo. cloth, 4s 1853
CONQUEST'S (Dr. J. T.) Outlines of Midwifery, plates, 12mo. 2s 1824
DAVIS' (D.) Elements of Operative Midwifery plates, 4to half bd. 10s 6d 1825
DAVIS (D.) Principles and Practice of Obstetric Medicine in a Series of Systematic Dissertations on Midwifery, and on the Diseases of Women and Children, illustrated by numerous plates, 2 vols. 4to. half calf, 30s. pub. at £4 4s 1836
—— Elements of Obstetric Medicine, 8vo cloth with atlas of plates, 4to, 15s 1841
DOEVEREN (G. Van) Specimen Observationum academicarum ad monstrorum Historiam, Anatomen, Pathologiam et artem obstetriciam prœcipue spectantium, plates, 4to. 4s 1765
HAMILTON (Dr. A.) Theory and Practice of Midwifery, 1s 6d 1806
—— Letters to Osborne, Grigg's Advice to Females, and Rawlins' Obstetrics, 1 vol. 8vo 2s
HOSSACK'S Medical Essays, plates, and Ramsbotham's Practical Observations in Midwifery, 2 vols. 8vo. half calf neat, 8s 1830
HUNTER (W.) Anatomy of the Gravid Uterus large folio, fine copy, £1 12 *Baskerville* 1747
—— Description of the Gravid Uterus, 4to, 2s 6d 1794
INGLEBY'S (J. T.) Facts and Cases in Obstetric Medicine, with observations on Diseases of Women, 8vo. 3s 6d
LEE's Lectures on the Theory and Practice of Midwifery, cuts, 8vo cloth 8s 1844
Murphy's Lectures on Natural and Difficult Parturition, 8vo 5s 6d pub. at 9s 1845
RAMSBOTHAM (F.) Obstetric Medicine and Surgery, plates, 8vo cloth 13s 1851
SMELLIE'S Obstetric Tables, half bd. 15s 1754
—— Treatise on the Theory and Practice of Midwifery, 3 vols. 8vo. bd 5s 1766
SMITH'S (W. T.) Periodoscope, 8vo. 2s 1848

SPRATT'S (G.) Obstetric Tables comprising coloured delineations on a peculiar plan, 4to. 8s 1833
STREETER (J. S.) Practical Observations on Abortion, plates, 8vo. 2s 1840

Opthalmic Medicine and Surgery.

Adams (Sir W.) New Operation for Cataract, 8vo. 2s 1817
BOWEN (Dr. J.) Cataract, 8vo. 1s 6d 1824
Butter on Cataract, 8vo. bds. 1s 1783
DEGRAVERS (Dr. P.) on the Human Eye, 8vo. bd. 2s 1788
GUTHRIE (G. J.) Lectures on the Operative Surgery of the Eye, col. plates, 8vo. 7s 1823
HEWSON (T.) Opthalmia in Secondary Forms of Lues Venerea, col. plates, 8vo. 1s 6d 1824
HOLTHOUSE (C.) Pathology of Strabismus and its treatment by Operation, 8vo. cloth, 2s 6d 1854
HOWARD (H.) Anatomy, Physiology, and Pathology of the Eye, 8vo. cloth, 7s 1850
JONES (W.) Opthalmic Medicine and Surgery col. plate, 12mo. cloth, 7s 1847
—— Wisdom and Beneficence of the Almighty in the Sense of Vision, col. plate 12mo 3s 6d
LAWRENCE's Diseases of the Eye, 8vo 4s 1833
—— Another copy, 8s 6d 1844
—— Diseases of the Eye, edited by Dr. Isaac Hays, engravings, 8vo. bd. 10s *Phil.* 1854
LITTELL on the Diseases of the Eye (enlarged by Houston), 12mo. cloth, 1s 6d 1840
LUCAS (B.) Strabismus, colored plates, 8vo. 2s 6d 1840
MACKENZIE'S (Dr. W.) Physiology of Vision, 8vo. *woodcuts*, 3s 1841
—— Practical Treatise on Diseases of the Eye, plates and cuts, 8vo. 5s 1835
—— ditto, 8vo cloth 8s 1840
Morgan (J.) Lectures on Diseases of the Eye, col. plates, 8vo cf. neat, 6s 6d (pub. at 18s) 1839
—— ditto, edited by France, 8vo. 10s 1848
Saunders (J. C.) Diseases of the Eye, with Life by Farre, col. plates, roy. 8vo. 5s 1811
SCARPA'S Diseases of the Eye, translated by Briggs, plates, 8vo. 3s 1818
—— Maladies des Yeux, par Leveille, plates, 2 vols. 8vo. half bd. 2s 6d 1802
ROWLEY (Dr. W.) Diseases of the Eye and Eyelids, plates, 8vo 2s 1790
Stevenson on Cataract, 12mo. 1s 1839
STEVENSON (J.) Amaurosis, 8vo. 1821 and Cheyne (Dr. J.) Cases of Apoplexy and Lethargy, 8vo. 1812 1 vol. 3s
Travers and Green's Opthalmic Surgery, by Lee, 18mo 1s 6d 1839
VETCH (Dr. J.) Diseases of the Eye, coloured plates, 8vo. 3s 1820
—— Account of the Opthalmia which has appeared in England since the return of the Army from Egypt, col. plates, 8vo. 2s 1807
WENZEL (Dr.) Manuel de l'Oculiste, plates, 2 vols. 8vo. half bd. 2s 6d *Paris* 1802
WALKER (J.) Oculist's Vade Mecum, col. plate, 12mo cloth, 3s 1843
—— (J.) Opthalmic Surgery, 12mo. 1s 6d 1834
WARE'S (J.) Chirurgical Observations relative to the Eye, 2 vols. 8vo. bound, 3s 1805
—— on Cataract and Gutta Serena, 8vo 1s 6d
WELLER'S Traite Theorique et Practique des Maladies des Yeux, 2 vols. 8vo. 5s 1832
—— Manual of the Diseases of the Human Eye, by Monteath, 2 vols. 8vo. col. plates, 5s 1821

Physiology.

ALISON'S (Dr. W. P.) Outlines of Physiology 8vo. cloth, 2s 1814
BRODIE (Sir B.) Physiological Researches, 8vo cloth, 3s 1851
Carpenter (Dr. W. B.) Human Physiology, thick 8vo cloth, 16s (pub. at 28s) 1853
—— Human Physiology, plates, 8vo. 5s. 1842
CARPENTER'S Vegetable Physiology, 8vo. cloth, 2s 6d 1841
—— Cyclopædia of the Natural Sciences, Animal Physiology, 2 parts, 5s. pub. at 10s 1843
CHARAS (M.) New Experiments upon Vipers, plates, 12mo. bd. 2s 1673
CHARLETONI (Gualteri) Æconomiae Animalis, 24mo. bd. 1s 1666
CYCLOPÆDIA of Anatomy and Physiology, Vols. 1 and 2, roy. 8vo. half calf, £2 10s (pub. at £4 10s)
—— ditto, Vol. 1. and 4 pts. 30s (pub. at £3)
DUNGLISSON's Human Physiology, with 300 ilustrations, 2 vols. royal 8vo. bd. 6s 1844
DUTROCHET'S Memoires Anatomique et Physiologique des Vegetaux et des Animaux, avec un Atlas de 30 planches, 3 vols. half calf, 12s 1837
—— Human Physiology, woodcuts, 8vo. 2s 1835
—— ditto, 8vo. 12s (pub. at £2 2s) 1840
FLETCHER (Dr. J.) Rudiments of Physiology, 8vo. 6s 1837
GORDON (J.) Outlines of Lectures on Human Physiology, 8vo. 1s 6d 1817
HALLER'S Elementa Physiologia Corporis Humani, 8 vols. in 4, 4to. half calf neat, £2 12s 6d *Laus.* 1778
—— Another Copy, 8 vols. bd. £2 2s 1778
—— Bibliotheca Botanica, 2 vols. 4to. calf, 10s *Lond.* 1771
—— First Lines of Physiology, by Cullen, 2s
HOLLAND (Dr H) Chapters on Mental Physiology, 8vo 7s 1852
JEFFRIES (J) Statics of Human Chest, Animal Heat, &c., 8vo. cloth, 3s 1843
JONES (B) Animal Electricity, 12mo 4s 1852
KIRKES and PAGET'S Hand Book of Physiology, 12mo. cloth, 5s 1848
LORD'S Popular Physiology, 12mo 2s 6d 1834
MAGENDIE'S Physiology by Milligan, 8vo. half calf, 2s 6d 1831
MAYO'S (H.) Outlines of Human Physiology, 8vo. 2s. 1833. Another copy, 3s 1837
—— on the Nervous System. 8vo. cl. 2s 1842

Mojon's Laws of Physiology, by Skene, 8vo 1s
MULLER'S Physiology, by Baly, 2 vols. 8vo half calf, 18s (pub. at £2) 1840-2
MULLER'S Physiology, vol. 1. 8vo. 6s 1838
—— Intimate Structure of the Secreting Glands by Solly, plates, 8vo. 3s 1839
—— Embryology with the Physiology of Generation, by Baly, plates, 8vo. 4s 1848
—— Physiology of the Senses by Baly, 8vo. cl. 4s 1848
PUGH'S (John) Treatise on the Science of Muscular Action, 4to. bds. beautiful plates, 3s 6d 1794
REID's Physiological, Pathological, and Anatomical Researches, 8vo cl. 9s (pub. 18s) 1848
RICHERAND S Elements of Physiology, by De Lys, half calf, 8vo 2s 1819
ROGET [Dr P. M.] Treatises on Physiology and Phrenology, 2 vols 8vo 6s 1838
—— on Human and Comparative Physiology, 8vo 1s 1826
SHEARMAN (Dr. E. J.) on the Properties of Animal and Vegetable Life, &c. 8vo. 3s 1845
STRUTHERS (Dr. J.) Anatomical and Physiological Observations, plates, 8vo cloth 3s 6d 1854
VALENTIN (G.) Traite de Nevrologie, traduit par Jourdan, 8vo. half calf, 4s 1843
—— Text Book of Physiology, plates, part 1 8vo. 9s 1853
—— Lehrbuch der Physiologie des Menschen, 2 vols. 8vo. half calf neat, 8s 1844
WAGNER'S Physiology by Willis, 8vo. 5s 1844

Serials.

ANNUAIRE de Chimie, comprenant les applications de cette science a la medicine et a la pharmacie, par E. Millon et J. Nickles, 7 vols. 8vo. 18s 1845-51
Annual of Scientific Discovery, edited by Wells and Bliss, 4 vols. 8vo. 10s 1850-3
Braithwaite's Retrospect, Vols. 1 to 18, 12mo. cloth, £2 2s 1843-48
BRAITHWAITE'S Retrospect, Vol. 2, 1s 6d, Vols. 5 to 12, 2s 6d each, Vols. 13 to 17, 3s each. Vol. 23, 4s 1851
—— Vol. 1. (whole year) half bd. 1s 6d 1804
BRITISH and Foreign Medical Review, edited by Forbes and Conolly, 24 vols. and British and Foreign Medico-Chirurgical Review (in continuation) 7 vols. and 12 parts. In all 31 vols. uniformly bound in cloth, lettered, £6 10s (pub. at £22 4s) 1836-54
—— ditto, Vols. 1 to 20, and Index vol. half calf, marbled edges, £3 3s 1836-46
BRITISH and Foreign Medical Review, from 1836 to 1845 (wants 1839) 30s
—— No. 19 to 24, ea. 1s 34. 1s 6d 1844 nos. 5, 15, 16 new ser. ea. 2s 6d Vol. 2, 3s 1848
DUBLIN Quarterly Journal of Medical Science. nos. 1 to 11, new series, 20s 1846-8
EDINBURGH Medical and Surgical Journal, Nos. 107 and 121, 1s each 1831-4
Edinburgh Academic Annual, 8vo. 1s 1840
GUY'S Hospital Reports, pt. 4 to 8, at 3s each, 1837-9
JORNAL do Sociedale das Sciencias Medicas 1 vol. cloth, 2s 1841-2
LANCET from the Commencement 1825 to 1852 48 vols. half cloth, 4 vols. in nos. (wants vols. 1839-43) £6
—— 2 vols. hf. cf. 4s 1844 vol. 1. hf. cf, 2s 1845
—— Vol. nos. 2s 1850
LONDON Medical Gazette, 45 vols. Complete from the commencement. 30 vols. uniformly bound, half calf, full lettered, the rest half cloth, £6 8s 1827-1850
—— New series, Vol. 1, 8vo hf. cf. 3s 1845
London Journal of Medicine, complete in 4 vols 8vo 30s 1849-52
Medical Times, New Series, Vol. 4 cloth, 4s 1852
—— ditto, vols. 10 to 12, 3 vols hf. cf. 4s 6d
—— ditto, vols 19 and 20, pts. 3s
MICROSCOPICAL Science—Quarterly Journal of—By Lankester and Busk, parts 8 to 12, at 2s 9d each 1854-5
PROVINCIAL Medical and Surgical Journal, 4 vols. half bd. 8s 1845-8
Ranking's Half-Yearly Abstract of the Medical Sciences, Vols. 1 to 15, 12mo. cloth, £2 10 1845-52
—— Half-Yearly Abstract of the Medical Sciences, vols. 1 to 8, 12mo. 22s 1845-8
RANKING'S Abstract of the Medical Sciences, Vols. 1, 2, 4, 2s 6d. 5 and 6, 3s each
Reports of the British Association for the advancement of Science, 12 vols. 8vo, £5 8s (pub. at £8 11s) 1844-54
—— 1st and 2nd Reports, 8vo. 7s (pub. at 18s)
—— Third Report, 8vo. 5s (pub. at 12s) 1834
—— Fourth Report, 8vo. 6s (pub. at 15s) 1835
—— Fifth Report, 8vo. 6s (pub. at 13s 6d) 1836
—— Eleventh Report, 8vo. 7s (pub 13s 6d) 1841
Transactions of the Pathological Society, plates colored and plain, vols. 4 and 5, 8vo 18s 1853-4
TRANSACTIONS of the Medico-Chirurgical Society, Vols. 1 to 38, and Index-vol. to vols. 1 to 33, £11 11s 1855
YEAR BOOK OF FACTS, 12mo ea. 3s 1852-4

Surgery.

ABERNETHY'S (J.) Lectures on Anatomy, Surgery, and Pathology, 8vo. 2s 6d 1828
—— Surgical Works, 2 vols. 8vo. 4s 1811
—— Enquiry into the Probability and Rationality of Mr. Hunter's Theory of Life, 8vo. 1s
—— Local Diseases and Aneurisms, 8vo. 1s 6d 1822. ditto including directions for the Treatment of Disorders of the Digestive Organs, 8vo. 2s. 1826
ACRET (G. S.) on Hernia, 8vo. 1s 6d 1835
ACTON (W.) Diseases of the Urinary and Generative Organs, 8vo. and Atlas of col. plates, folio, 33s 1851
ASHTON (T) Corns and Bunions, 8vo 2s 1852
Averill's Operative Surgery, 8vo 1s 1823

AMESBURY'S (Joseph) Practical Remarks on Deformities of the Spine, Chest, and Limbs, Muscular Weakness, Weak Joints, &c. illustrated by plates and cases, 4to. 12s (pub. at £1 11s 6d) 1840
—— Syllabus of Surgical Lectures, plates, 8vo. 1s 6d 1827
—— on Fractures, plates, 8vo. hf. cf. 2s 6d 1829
AUSTIN (Dr. W.) on Stone in the Urinary Bladder (Gulstonian Lectures) roy. 8vo. 1s 6d 1791
BELL (C.) System of Operative Surgery, founded on the basis of Anatomy, 2 vols. royal 8vo bd. plates, 6s 1807 9
—— Institutes of Surgery, 2 vols. 8vo. 4s 6d 1838
—— on Injuries of the Spine and Thigh Bone, *plates*, 4to. cloth 6s 1824
—— Illustrations of the Great Operations of Surgery, fol. *col. plates*, 21s (pub. at £5 5s) 1821
—— Diseases of Bones, plates, 12mo 1s 6d 1828
BELL'S (Dr. J.) Principles of Surgery, plates plain and coloured, 3 vols. 4to. half calf extra, 35s (pub. at £13 13) 1801-8
BINGHAM (R.) Strictures of the Urethra and Diseases of the Testicles, 8vo 3s 1820
BIRD (Dr G) Urinary Deposits, 8vo. 2s 6d 1846
BISHOP (J.) Pathology and Treatment of Deformities, illustrations, 8vo cl. 7s 1852
Bower's Memoranda for the College, 32mo 2s
BRODIE (B.) on Diseases of the Joints, 8vo. 3s 6d 1834
—— Diseases of Urinary Organs, 8vo. 3s 1835
—— ditto, 7s 6d 1849
BRUGIS (T.) Vade Mecum; or a Companion for a Chirurgian, 18mo. bd 1s 1675
CAMPER (P.) Icones Herniarium, editæ a S. T. Sœmmering, plates, 4to. half russia, 8s 1801
CARPUE'S History of the High Operation for Stone, 8vo. 1s 6d 1819
CASTLE'S (T.) Manual of Surgery, 12mo. 2s 1831
CHAPMAN'S Treatment of Obstinate Ulcers of the Leg, 8vo cl. 2s 1853
CHELIUS' System of Surgery by South, 2 vo's. (wants index) 35s 1847
—— Handbuch der Chirurgie, 2 vols. 8vo. 5s 1826-7
CHESELDEN—Lithotomus Castratus: or Mr. Cheselden's Treatise thoroughly examined &c. mor. gilt, 2s 1723
CHURCHILL (J.) Acupuncturation, 8vo. 1s
CANTON (E) Surgical and Pathological Observations, plates, 8vo cloth 4s 6d 1855
COOPER (Sir A.) Dislocations and Fractures, 4to. 12s. Do. bds. uncut 15s 1824
—— Ditto, by Lee, plates, 8vo. 7s 6d 1841
—— Manual of Surgery, plates, 12mo. 2s 6d 1853
—— Anatomy of the Thymus Gland, plates 4to. 10s 1832
COOPER (Sir A.) on the Structure and Diseases of the Testis, edited by Bransby Cooper, col'd plates, 15s 1830 Ditto, 21s 1830
—— (Bransby) on the Ligaments, plates, 4to. 7s 1827
—— Lectures on Anatomy with practical remarks, plates, 4 vols roy. 8vo. 8s (pub. at £3 1829-32
—— Lectures on Anatomy, Vol. 1. plates, roy. 8vo. half calf, 2s 1829
—— Lectures on the Principles and Practice of Surgery, 8vo. cloth, 10s 1851
—— Surgical Essays: the result of Clinical Observations made at Guy's Hospital, col. plates, roy. 8vo. 4s 1833
—— (S.) First Lines of the Practice of Surgery, 8vo 8s 1840 Do., 2s 1809 Do. plates, 3s 1818
—— Ditto, calf, 4s 1836
—— Dictionary of Practical Surgery, 8vo. 6s 1830 Ditto, 2 vols. 4s 1822 Ditto, 2s 1813
—— Surgical Dictionary, 8vo. (last edition, 16s (pub. at 30s) 1838 ditto, hf. cf. 7s 1830
COPELAND (T.) On diseases of the Spine, and Home on Cancer, 8vo. hf cf, 1s 6d 1815
CORFE (G.) on the Kidney, plate, 8vo. 3s 1839
COURTENAY (F. B.) Pathology and Cure of Stricture of the Urethra. 8vo. 2s 1843
COULSON (W.) on the Hip Joint, colored and plain plates, 4to. 6s 1837 Do. 8vo 3s 6d 1841
—— on the Bladder and Prostate Gland, plates 8vo. 3s 6d 1842 Ditto, 3s 1838
COULSON (W.) Lithotrity and Lithotomy, engravings, 8vo. cloth, 7s 1853
CRITCHETT'S Ulcers of the Lower Extremity 8vo 2s 6d 1849
CROSSE (J. G.) Urinary Calculus, plates, 4to 18s 1835
CURLING (T. B.) Tetanus, 8vo. 3s 6d 1836
—— Diseases of the Rectum, 8vo 2s 6d 1851
DAVIES (J.) Pathology and Surgery, 2s 1839
DESAULT (P. J.) Œuvres Chirurgicales par X. Bichat, 2 vols. portrait and plates, 8vo. 2s 6d 1801
DODS (Dr. A.) Rotated or Contorted Spine, 8vo. 1s 6d 1824
DUFFIN (Dr. E.) Lateral Deformity of the Spine, *plates*, 8vo. 1s 6d 1835
DRUITT'S (R.) Surgeon's Vade Mecum, 12mo. 8s 6d 1854 Ditto, 5s 1847
DUVERNAY (M.) Treatise on the Ear, by Marshall, 12mo. plates, 2s 1748
EARLE (J.) On Operation for Stone, 8vo. half bd. 1s 6d 1793
EPPS (G. N.) Spinal Curvature, col. plates, 4to. cloth, gilt edges, 6s (pub. at 12s 6d) 1849
ERICHSEN (J.) Science and Art of Surgery, 8vo cloth 17s 1853
FERGUSSON'S (W.) System of Practical Surgery, 12mo. 5s 1846
FORD (E.) Diseases of the Hip Joint, plates, 8vo half bound 2s 1794
GILLMAN (J.) on the Bite of a Rabid Animal, 8vo. bd. 1s 6d 1812

GODFREY (Mrs.) on the Prevention and Cure of Spinal Curvatures, &c. 8vo. cloth, 2s 1851
GOOCH'S (B.) Chirurgical Works, 3 vols. 8vo. bd. 6s 1792
GUERIN (Jules) Rapport sur les Traitements Orthopediques a l'Hopital des Enfans, pendant les annees 1843-4 5, 4to. 4s 1848
HARE (S.) on Curvatures of the Spine, royal 8vo, plates, 2s 1838 Ditto, 4s 1849
—— on the Stomach and Alimentary Organs, 8vo. 2s 1821
HEARTELOUP'S Lithotrity, plates, 8vo. 4s (pub. at 20s) 1831
HEY'S Practical Surgery illustrated by cases, plates, 8 o. 3s 1814
HILLES (M W.) on Hernia, 12mo. 1s 1838
HIND (G. W.) Series of 20 plates illustrative of the causes of Displacement in the various Fractures of the Bones of the Extremities, fol. cl. 18s 1835
HODGSON (J.) Diseases of Arteries and Veins, Aneurisms and Wounded Arteries, 8vo. with Atlas of plates, 4to. (scarce) 26s 1815
HOME's Surgical Works, 3 vols. plates, 6s 184
HOWSHIP (J.) Appearance and discrimination of Surgical diseases, 8vo. 2s 6d 1840
—— On diseases of the Lower Intestines and Anus 8vo. half calf neat, 1s 6d 1824
HUNTER (J.) Works by Palmer, 4 vols. 8vo and Atlas of plates, 4to. 26s uncut 1837
—— Introductory Lectures, 4to. 1s 6d 1784
—— Natural History of the Human Teeth, pt. ii. 4to. 1s 1788
—— (J) on the Animal Æconomy, plates, 4to. bd. 5s 1786
—— on the Blood, Inflammation, and Gun-shot Wounds, plates, 4to. bd. 5s 1794
—— ditto, plates, 2 vols 8vo 4s 1812
JALADE LAFOND Researches Pratiques sur les principales Difformites du Corps Humain et sur les moyens d'y Remedier, 3 parts, plates, 4to 14s 1827-9
JEFFREYS (H.) Cases in Surgery, plates, 8vo. 2s 1820
LALLEMAND on Spermatorrhœa, by M'Dougall, 8vo. cloth, 7s 6d (pub. at 12s) 1851
LAWRENCE (W) on Ruptures, 8vo, 2s 6d 1825
LE CLERC'S Complete Surgeon, plates, 8vo. 2s 1727
Lion (H.) Spinæ Pedum, plates, 8vo 1s 6d 1802
LISTON's Practical Surgery, 8vo. 4s 6d 1840
LISTON (R.) Elements of Surgery, 8vo. cloth, plates, last edition, 8s 6d (pub. at 25s) 1840
—— on a Variety of False Aneurisms, 8vo. 6d 1847
LITTLE (Dr. W. J.) Club-foot, and Analogous Distortions, cuts, 8vo. 4s (pub at 12s) 1839
—— Ankylosis, or Stiff Joint, woodcuts, 8vo. 4s (pub. at 8s 6d) 1843
LONSDALE (E. F.) Treatment of Lateral Curvature of the Spine, cuts, 8vo. 2s 6d 1847

LIZARS' (J.) Stricture of the Urethra and Fistula, plates, col and plain, 8vo. 7s 1853
—— System of Anatomical Plates of the Human Body, accompanied with descriptions, and Physiological, Pathological and Surgical Observations, folio, col. half-bound russia, gilt top, £3 5s 1840
M'CLELLAN (Dr. Geo.) Principles and Practice of Surgery, edited by his Son, royal 8vo. bd. 3s *Phil.* 1848
MANEC (P. J.) Traite de la Ligature des Arteries, col. plates, fol. 4s 1832
MALGAIGNE (J. F.) Manuel de Medicine Operatoire, 12mo. 5s 1854
MARCET (Dr. A.) on Calculus Disorders, col. half calf neat, 6s 1819
Mayo's Injuries and Diseases of the Rectum, 8vo 2s 6d 1833
MILLER'S (Jas.) Principles of Surgery, 8vo. 9s 1850
—— Practice of Surgery, 8vo. cl 10s 6d 1852
M'Intyre's (J.) Description of Splint, plates 8vo. 1s 1825
MONRO's Crural Hernia, plates, 8vo. 2s 1803
—— on the Urinary Bladder and Perinæum, plates, 8vo. 3s 1842
Paul (A.) Diseases of the Lower Bowel, plates, 8vo 1s 6d 1853
PETIT (J. L.) Diseases of the Bones, cuts, 8vo. bd 2s 1726
POTTS (P.) Chirurgical Works, by Earle, 3 vols. 8vo. scarce, 9s 1808
—— Ditto, 3 vols. 6s 1783
—— Ruptures, 8vo. 3s 1756
RAMSDEN (T.) Sclerocele and Hydrocele, plates, 8vo, half calf, 4s 1811
RHEAD'S (A) Somatokaphia Anthropine, or a description of the Human Body, with the practice of Chirurgery, 200 wood engravings, 8vo bd 2s 6d Ditto, 3s 6d 1634
Robinson on Gravel and Stone, 8vo. bd. 1s 1723
SEDILLOT Medicine Operatoire Bandages et Appareils, 606 wood-cut illustrations, 2 vols. in 4 parts, 12mo 12s 6d 1853-5
SALMON (F.) Prolapsus of the Rectum, 8vo 1s 6d 1831
SCARPA sur l'Aneurisme, par Delpech, with folio Atlas of Plates, 7s 1809. Do. 10s 1813
—— Aneurism by Wishart, plates, 8vo 3s 1819
—— (Antoine) Traite Pratique des Hernees, plates, 4s 1812
—— Tabulæ Nevrologicæ, plates, fol. half-mor. 18s 1794
SCULTETI Armamentarium Chirurgicum, plates, 8vo. vellum, 3s 6d 1657
SHARP (S) Tratado das Operacoens de Cirurgia, traduizido en Portagues, par J. de Castro Sarmento, plates, 8vo. calf, 3s 1546
SPENDER (J. C.) Ulcerous Diseases of the Leg, 8vo 2s 1835
STAFFORD on Strictures of the Urethra, 8vo. half calf, neat, 3s 1829
—— (Dr. R.) Prostate Gland, 8vo. 2s 1845

SKEY (F. C.) Operative Surgery, 8vo. 13s 1850
SHAW (John) on Defects in the Form of the Spine, plates, 8vo. bds. 4s 1829
—— Another Copy, 2s 6d 1827
—— Nature and Treatment of the Distortions to which the Spine and Bones of the Chest are subject with two Supplements, plates, 8vo. and illustrative engravings fol. 18s 1823
STANLEY (E.) Hunterian Oration, 4to. cloth. 1s 1839
—— Lateral Operation of Lithotomy, coloured plates, 4to. 7s 6d 1829
Staples (J.) Art of Cupping, 12mo. bd. 1s 1835
SYDER'S Principles and Practice of Modern Surgery, 8vo 2s 1821
SYME (J.) Principles of Surgery, plates, 8vo. cloth, 7s (pub. at 15s) 1842
—— Ditto, half calf neat, 3s 6d 1832
—— Diseases of the Rectum, 8vo cloth 3s 1854
—— Pathology and Practice of Surgery, 8vo. 4s 6d 1848
TAMPLIN (R. W.) Lectures on Deformities, cuts, 12mo. cloth, 4s (pub. at 7s 6d) 1846
VELPEAU Anatomie Chirurgicale generale et Topographique du corps humain, royal 8vo. calf, 3s 6d 1834
—— Another Copy, sewed, 2s 1834
—— Nouveaux Elemens de Medicine Operatoire 3 vols. 8vo. calf neat, and atlas of plates 4to. 22s 1822
VERRAL (C.) On the Spine, its Curvatures and other Diseases, their symptoms, treatment and cure: to which are added some remarks on Paralysis, 8vo. plates, 1s 6d 1851
WADD'S (W.) Cases of Diseased Bladder and Testicle, plates, 4to. 4s 1817
WADE (Dr. R.) Stricture of the Urethra, 8vo. cloth, 3s 6d 1853
WARD (W. T.) Distortions of the Spine, Chest, and Limbs, 8vo. 3s 6 1840
WARDROP (J.) Aneurism, royal 8vo. plates, 2s 6d 1828
—— Fungus Hœmatodes, plates, 8vo. 3s 1809
WARREN (Dr. J. C.) Surgical Operations on Tumours, with Cases and Observations, col. plates, roy. 8vo. 7s 1838
WHATELEY (T.) Wounds and Ulcers, 8vo 1s
WHITE'S (R.) Practical Surgery, 8vo. 1s 1796
—— (W.) Contracted Intestinum Rectum, 12mo. 1s 1812
WILLIS (Dr. R.) Stone in the Bladder, 8vo. 2s 6d 1842
—— Urinary Diseases and their Treatment, plates, 8vo. half mor. 6s (pub. 12s) 1838
WILSON (J.) Urinary and Genital Organs, plates, 8vo. 6s 1821

Sydenham Society's Works.

A COMPLETE SET of the Society's Works, 30 vols. £7 1844-53
CHURCHILL'S Diseases peculiar to Women, 7s 1849
BECKER (J. E.) on Aneurism, 3s 6d 1844
DUPUYTREN'S Injuries and diseases of the Bone by Le Gros Clarke, 5s 6d 184
—— Lesions of the Vascular System, Diseases of the Rectum, &c. by Le Gros Clark, 8s 185
FEUCHTERSLEBEN'S Medical Psychology by Lloyd and Babbington, 8s 184
HARVEY'S Works, by Willis, 6s 6d 184
HASSE'S Pathological Anatomy, 5s 184
HEWSON (W.) Works, by Gulliver, 5s 184
HIPPOCRATES' Genuine Works, by Adams, vols. 13s Ditto, Vol. 1. 5s 184
LOUIS on Phthisis, by Walshe, 6s 6d 184
HUNTER'S Gravid Uterus, plates, fol. 12s
OTTLEY'S (D.) Translation of Observations o Surgical Disease of the Head and Neck, se lected from the Memoirs of the Royal Academ of Surgery of France, 8vo. 3s 6d 184
OESTERLEN'S Medical Logic, by Whitley, 7s 185
PAULUS ÆGINETA, the seven books of, trans lated from the Greek, with a commentary em bracing a complete view of the knowledg possessed by the Greeks, Romans and Arabian on all subjects connected with Medicine an Surgery, by Francis Adams, 3 vols. 12s Vol 1 and 2, 7s 1844-
RHAZAS on Small Pox and Measles, by Green hill, 5s 184
ROKITANSKY'S Pathological Anatomy, vols. and 3, 18s 1849-5
SCHWANN and SCHLEIDEN'S Microscopical Re searches into the Accordance or Structure o Animals and Plants, by Smith, 6s 6d 184
SYDENHAM Opera Omnia, edited by Greenhil 6s 184
—— Works, translated by Dr. R. G. Latham, vols. 12s 184
UNZER and PROCHASKA on the Nervous Syste by Laycock, 6s 185

Syphilis.

ASTRUC on the Venereal Disease, 2 vols. 8vo half calf neat, 2s 6d 173
BELL (B.) on Venereal Diseases, 2 vols. 8vo bd. 2s 6d 177
BOYLE (J.) Syphilis, 8vo. 1s 182
CARMICHAEL (R.) on Venereal diseases col. plates, 8vo. bds. 3s 182
—— (H.) Turpentine in Venereal and other deep-seated Inflammation of the Eye, 8vo 1s 182
—— on Venereal Diseases which have been confounded with Syphilis, col. plates, 4to. 5s 181
COLLES (Dr. A.) Practical Observations on the Venereal Disease, and the Use of Mer cury, 8vo. cloth, 3s (pub. at 9s) 1837
FOOT (Jesse) Nature, Symptoms, and Cure of Lues Venerea, 8vo. 2s 1820
HOWARD (J.) on the Venereal Disease, plates 2 vols. 8vo. half calf, 3s 6d 180
HUNTER'S Venereal Disease, plates, 4to. bd 8s 178
—— ditto, edited by Adams, plates, 8vo 2s 18

JUDD (W) Urethritis and Syphilis, col. plates. 8vo 12s (pub. 25s) 1836
LAWRENCE on Venereal Disease of the Eye, 8vo. half calf, 4s 6d 1830
MATHIAS (A.) Mercurial Disease, 8vo. bd. 1s 6d 1810
WILSON (E.) Syphilis, plates, 8vo 10s 6d 1852

Women and Children.

Armstrong J. on Puerperal Fever, 8vo. 2s 1819
ASHWELL (Dr. S.) Diseases of Women, 8vo. 5s 6d 1845
Astruc's Diseases of Women, plates, 2 vols. 8vo bd. 3s 6d 1762
BENNETT (Dr. J. H.) Inflammation, &c., of the Neck of the Uterus, 8vo. cl. 2s 1845
BILLARD (C.) Maladies des Enfans nouveaux-nes et a la Mamelle, 8vo. and Atlas of colored plates, 4to. 8s 6d 1828
BIRKETT (J.) Diseases of the Breast and their Treatment, col. plates, 8vo. cl. 8s 6d 1850
Bull's Maternal Management of Children, 12mo cloth, 3s 6d 1851
BURNS (J) Diseases of Women and Children, 8vo. bd. 2s 1811
—— Anatomy of the Gravid Uterus, plates, 8vo. 2s 1799
CHEYNE (Dr J) Diseases of Children, with Cases and Dissections, coloured plates, imp. 8vo half bd. 5s 1801-2
CHURCHILL (F.) on the Diseases incident to Pregnancy and Childbed, 8vo. cl. 3s (pub. at 12s) 1840
CLARKE (J) Commentaries on some of the most Important Diseases of Children, 8vo. 2s 1815
—— (C. M.) Diseases of Females, Part 1. Mucous Discharges, plates, roy. 8vo. 4s 1821
COLEY'S Diseases of Children 8vo. 6s 1846
—— On the Remittent Fever of Infants, 8vo. bd. 1s 6d 1813
DUNGLISON (Dr. R.) on Diseases of the Stomach and Bowels of Children, plate, 8vo. bds. 2s 1824
ELLIS (R.) Disease in Childhood,—its common causes and directions for its practical management, 12mo. 2s 6d 1852
FOX (J.) on Chlorosis, 8vo 2s 6d 1839
GRAHAM. Diseases of Females, 8vo 6s 1850
Green (H.) on Croup, 8vo cloth, 1s 1849
HALL (Dr M) Diseases of Females, col. plates, 8vo. cl. 5s (pub. at 16s)
HAMILTON's Female Complaints, and Children in Early Infancy, 8vo hf. bd, 2s 6d 1792
—— (Dr. J.) Diseases of Infancy and Childhood, 8vo. 2s 1824
HARRIS de Morbis Acutis Infantum, 8vo. bd. 2s 1720
HEY (Wm.) on Puerperal Fever, 8vo. 2s 1815
LEE (Dr. R.) Diseases of Women, 8vo half calf, 2s 6d 1833
LEVER (Dr.) Organic Disease of the Uterus 8vo, 3s 6d 1843
LEY (Dr. H.) Laryngismus Stridulus, col. plates, 8vo. 4s, pub. at 15s 1836
LIZARS' Extraction of Diseased Ovaria, illustrated by plates, col'd. after nature, fol. 6s 1825
Marley's (M.) Diseases of Children, 8vo 2s 1830
Mitchell (Dr. T. R.) Use of the Speculum, 8vo 2s 6d 1849
MOORE (G.) Puerperal Fever, 8vo. 2s 6d 1836
RIDGE (Dr. B.) Physiology of the Uterus, Placenta, and Fœtus, &c. plate, 8vo. 1s 6d 1845
RIGBY (Dr. E.) on Uterine Hæmorrhage, 8vo 2s 1822
ROWE (G. R.) on some of the most important diseases of Women, 8vo, 1s 6d 1844
Smith (Dr. H.) Letters to Married Women on Nursing, &c. 8vo. 2s 1792
SPARRMAN (Dr. A.) Diseases of Children translated from Von Rovenstein, 8vo. half bd. 2s 1776
WEST (Dr. C.) Lectures on the Diseases of Infancy and Childhood, 8vo 7s 6d 1852
—— ditto, 8vo 4s 6d 1848

Zoology.

BLUMENBACH'S Comparative Anatomy, by Lawrence and Coulson, 8vo 2s 6d 1827
CARUS (C. G.) Comparative Anatomy of Animals, by Gore, 2 vols. 8vo. and Volume of plates, 4to. 18s (pub. at £3) 1827
—— Lehrbuch der Zootomie, 8vo. with Atlas of plates, 4to. 6s *Leips.* 1818
CUVIER's Animal Kingdom, by Carpenter, Westwood, Blyth, Johnston, and Mudie, plates imp. 8vo half calf, (quite new) 13s 1854
EDWARDS (Milne) Zoologie, 12mo 4s 6d 1855
—— Elemens de Zoologie, 8vo hf. cf. 5s 1834
HOME (Sir E.) Lectures on Comparative Anatomy, plates, 6 vols. 4to. large paper, £5 (pub. at £27 10s) 1814-27
GRANT'S (R.) Outlines of Comparative Anatomy, 8vo. 15s 1841
—— Lectures on Comparative Anatomy, (from the Lancet) woodcuts, 8vo. half cf. 6s 1833-4
HARWOOD (Dr. B.) Comparative Anatomy and Physiology, plates, and White (C.) on the regular gradation in man, and different animals and vegetables, plates, 4to. bd. 6s 1796-1799
HARWOOD (Dr. B.) Comparative Anatomy and Physiology, Vol. 1. plates, 4to. 2s 1796
JOHNSTON (Dr. G.) British Sponges and Lithophytes, col. plates, 8vo hf. cf. 22s 1842
JONES (T R) Animal Kingdom, 8vo 15s 1841
KLEIN'S Stemmata Avium, 40 plates, 4to. bd. 3s 1759
LAMOUROUX Corallina Classical Arrangment of flexible Corallinee Polypedons, plates, 8vo, 4s 1824
MATTEUCI'S Lectures on the Physical Phenomena of Living Beings by Pereira, 12mo. 3s 6d 1847
Shaw (Dr. G.) Zoology, Birds, plates, thick 8vo. cloth, 6s 6d 1819.

LAWRENCE (W.) Lectures on Man, plates, 8vo. 5s 1823
—— Ditto (original and suppressed edition), with Introduction to Comparative Anatomy, in one vol. half calf, 9s 1819-23
—— Ditto, 12mo. half calf, 3s 1838
—— Enquiry into the structure and animal economy of the Horse, plates, 4to. bd. 7s
REDI (Francesci), Experimenta circa generationem Insectorum et Opusculorum, 2 vols. 24mo. vellum, plates, 4s 1671-1729
STARK'S Elements of Natural History, containing the Generic Character of nearly the whole Animal Kingdom, and descriptions of the Principal Species, illustrative engravings, 2 vols. 8vo. 10s (pub. at 32s) 1828

ADAMS (Dr. J.) on Morbid Poisons, coloured engravings, 4to. hf. bd. 6s 1807
—— on Morbid Poisons, Phagedæna and Cancer, 8vo. bds. 2s. 1795
ÆGINETA (Paulus) Præcepta Salubria, 8vo. 1s 6d. 1511
AIME MARTIN'S Education of Mothers, by Lee, 12mo. 2s 1842
AINSLIE'S (Dr. W.) Materia Medica, 2 vols. 8vo. half calf, 21s (pub. at £2) 1826
ALEXIS (The Rev. Mayster) Secrets of:—containing many excellent Remedies against divers Diseases, Wounds, and other Accidents. fcp. 4to. bd. 12s black letter 1559-69
ALDINI (John) on Galvanism, plates, 1803—and Jenner on Cow Pox, coloured plates, in one vol 4to. half calf, 5s 1800
ARISTOTELIS Historia de Animalibus, Gr. et Lat. Scaligiri, fol. bd. 9s *Tolosæ* 1619
ARMITAGE (T. R.) Hydropathy as applied to acute disease, 8vo. 3s 1852
ARMSTRONG (Dr. J.) Morbid Anatomy of the Stomach and Bowels, col. plates, 4to cl, 16s 1838
ARNOTT'S Elements of Physics, Vol. I. half calf, gilt top, and vol. ii. pt. i, 8vo 30s 1833
—— ditto, vol. i. half calf, 24s 1829
—— Obstructions of the Urethra and other Canals. 8vo. 2s 1841
ATKINSON (J. C.) on Change of Air, 12mo. 1s 1848
—— Medical Bibliography, A and B, imp. 8vo 7s published at 16s 1834
BAILY Directions for Health, Naturall and Artificiall, &c. sm. 4to. bd. 4s 1633
BAIRD (D.) De Amaurosi Complectens, 8vo. bd, 1s 1808
BALDINGER (E. G.) Litteratura universa Materiæ Medicæ, 8vo. 1s 6d 1793
Barlow (W) Fatty Degeneration, 8vo 1s 6d 1853
BARRY (Dr. D.) Atmospheric Pressure upon the progression of the Blood, on Absorption, and on Bites of Rabid and Venemous Animals. 8vo. 2s. 1826
BEDDOES and Watt on Factitious Airs, 8vo. 2s 1796
BELLINI de Urinis & Pulsibus, &c. 4to. 2s. 16[illegible]
BENNETT (J. H.) Cancerous and Cancroid Growths, 8vo. cloth, 8s 1849
BIRD's Natural Philosophy, 12mo. 8s 1839
—— Ditto, 4s 6d 1844
BLAINE'S Outlines of the Veterinary Art, 8vo. 19s 1855
BOYLE (Hon. R.) Experiments on the Ice Noctilucæ, 12mo. bd. 1s 1681
—— on the Spring of the Air, 12mo bd. 1s 1660
—— (J.) Moxa in Stiff Joints, Chronic Rheumatism, &c. plates, 8vo. 1s 6d 1826
BROOKES' (Dr. R.) Introduction to Physic and Surgery, 8vo. bd. 1s. 1763
BRUNFELSIUS Catalogus Illustrium Medicorum sive de Primis Medicinæ Scriptoribus, small 4to. bd. 3s 1530
BUFF'S Physics of the Earth, by Hoffman, 12mo. 3s 6d 1851
BURKE (J.) Dispensing Chemist's and Medical Pupil's Assistant, 12mo. 1s 6d 1844
BURNETT (Dr. C. M.) Philosophy of Spirits in relation to Matter, 8vo. cloth, 5s published at 9s 1850
—— (Dr W.) on Fever in the Mediterranean, 8vo. half calf, 2s 6d 1814 Do. addns. 4s 1816
BURNS (J.) Inflammation, 2 vols. 8vo. half calf neat, 4s 1800
BUSHNAN (Dr. J. S.) Miss Martineau and her Master, fcp. 8vo. cl. 2s 6d 1851
—— Cholera and its cures, 8vo 2s 1850
—— Homœopathy and the Homeopaths, 12mo cloth, 3s 1852
BUTTER (Dr. W.) on the Kinkcough, 8vo bd. 2s 6d 1773
—— (J.) Irritative Fever, commonly called the Plymouth Dockyard Disease, 8vo. 1s 6d 1825
BEGGS (G.) Extent and Causes of Juvenile Depravity, 8vo 2s 6d 1849
CASTELLI Lexicon Medicum Græco-Latinum, 4to. vellum, 2s 6d 1746
—— Another Copy, 4to. vellum, 3s *Lips.* 1813
Catalogues of Royal College of Surgeons:
Physiological Series, plates, 5 vols. 4to. cloth £2 12s 6d 1833-40
Osteological Series, 2 vols. 4to cl. £1 1853
Calculi, pt. 1, plates, 4to cloth, 4s 1842
Fossil Mammalia and Aves, plates, 4to cloth, 11s 1845
Contents of the Museum, 5 vols 4to 12s 1831
—— Descriptive and Illustrated—of the Physiological Series of Comparative Anatomy in the Royal College of Surgeons, Vol. I. Including Organs of Motion and Digestion, 8vo. 3s 1852
—— of Calculi and other Animal Concretions in the Museum of the Royal College of Surgeons, plates, 4to. cloth. 5s 1842
—— of the Library of the Medical and Chirurgical Society of London, 2 vols. 8vo. 4s 1816-9
—— Ditto, 6s 1841

CHARLETON (Walter) Ternary of Paradoxes, sm. 4to. bd. rare, 12s 1650
—— Enquiries into Human Nature in six Anatomic Prelections, sm. 4to. bd. 3s 1680
CHEYNE (Dr. J.) on Health and Long Life, 8vo. bd. 1s 6d 1725
—— Cases of Apoplexy and Lethargy, 8vo. 2s 1812
—— English Malady; or a treatise on Nervous Diseases of all kinds, 8vo bd. 2s 1734
—— on the Nature and Method of Treating the Gout, 8vo. bd. 1s 1723
CHAMBERS (R.) Ancient Sea Margins, as Memorials of Changes in the Relative Level of Sea and Land, plates, 8vo cloth 4s 6d 1848
CLARKE (Dr. James) on the Influence of Climate in the Prevention and Cure of Chronic Diseases, 8vo. 4s 1829
—— Medical Notes on Climate, Diseases, &c. in France, Italy, and Switzerland, &c. 8vo. 1s 6d 1820
—— Consumption and Scrofula, 8vo. 4s 1835
—— (Sir A.) Essay on Bathing, 12mo. 1s 1820
—— (F. L.) Anatomy and Physiology of the Nervous System, 12mo. 2s 1836
CLARK'S (R.) Hippodonomia; or, the True Structure, Economy, and Laws of the Horse's Foot, 4to. plates, 5s 6d (pub. at 30) 1829
CLUTTERBUCK (Dr. H.) On the seat and nature of Fever, &c. 8vo. 2s 1807
—— Epidemic Fever, at present prevailing in this Country, 8vo. 2s 1819
—— on Bloodletting, roy. 8vo 2s 1840
COCHRANE on Vapour Bath, 1809—Key on Lithotomy, plates, 1824—Scarpa on Club Foot, by Wishart, plates, 1818; in 1 vol. 4to half calf, neat, 6s
COCKBURN (Dr. W.) the Nature and Causes of Looseness discovered, 24mo bd. 1s 1701
COLLIER'S (G. F.) Code of Safety, 8vo. cl. 3s. 1849
COMBE's Moral Philosophy, and Constitution of Man; in one vol. roy. 8vo. half calf, 3s 1846
COX (Dr. J. C.) Mineral Waters of Bay of Naples, plates, 8vo. 2s 1841
CROSS (J.) Sketch of Medical Schools of Paris, 8vo. half bd. 1s 6d 1815
CULPEPER'S English Physician enlarged, 12mo. bd. 2s 1799
—— Pharmacopœia, 12mo. bd. 2s 1702
CURTIS (J. H.) Physiology and Pathology of the Ear, &c. plates, 8vo. 2s 6d 1836
—— Preservation of Health, 12mo 1s 6d 1837
DAVID (M.) Prize Dissertations, by J. O' Justamond; 1st. on Motion and Rest; 2nd. on Counter-Strokes on the Human Body, 4to 2s 1790
DAVY (Sir H.) Agricultural Chemistry, by Shier, 8vo. 4s 1844
—— Researches, Physiological and Anatomical 2 vols. 8vo cloth, 5s 6d 1839
—— (Dr. J.) West Indies, before and since Emancipation, 8vo cloth 6s 1854

DE LA BECHE'S (Sir H.) Geological Observer, 8vo. 10s (pub. at 18s) 1851
DE LA RIVE'S Electricity, 8vo vol. 1. 13s 1853
DELEUSE'S Practical Instructions in Animal Magnetism, translated by Hartshorn, 8vo. cloth, 2s 6d (pub. at 4s) 1850
DICK (Dr. R.) Diet and Regimen, 12mo. 2s 1839
DICKSON (S.) Unity of Disease, 8vo. 2s 1839
DORVAULT L'Officine, ou Pharmacie Pratique, roy. 8vo. half calf neat, 4s 6d 1844
EDWARDS (Dr. G.) Diseases of the Human Body, 4to. bds. 2s 6d 1791
—— (Dr. W. F.) L'Influence des Agens Physiques sur la vie, 8vo. 4s 1824
ENCYCLOPÆDIA Britannica, new edition, Vol. I. 15s (pub. at 24s) 1853
ERSCH (J. S.) Handbuch der Deutschen Literatur—Medicini,-Naturkunde, 8vo. half calf 2s 1822
EYRE (Sir J. M.D.) Practical Remarks on some Exhausting Diseases, 12mo. 3s 1851
—— The Stomach and its difficulties, 3s 1852
FAITHORN (J.) on Liver Complaints, 1815, Home (E.) on Cancer, 1805; and Gibson (J.) on Bilious Diseases, 1799, in 1 vol. 8vo. bd. 2s
FAULKNER on the Plague, 8vo. bd. 3s 1820
FORSYTH (J. S.) Dictionary of Diet, 8vo. 3s (pub. at 10s 6d) 1834
GALENI Opera Omnia, fol. vellum, 9 vols. in 6, fine copy, £3 13s 6d *Venet.* 1556
—— Opera, Leoniceno interprete, sm. 4to. bd. 4s 6d *Steph.* 1514
GALL et SPURZHEIM'S Recherches sur la systeme nerveux en generale, et sur celui du cerveau en particulier avec une planche 4to. 2s 6d 1809
GARDNER (J.) Great Physician—the connexion of disease and remedies with the Truths of Revelation, 8vo. cloth, 3s 1843
Garrod's Materia Medica, 12mo 4s 6d 1855
GHERLI Centuria Prima di Medicina e Cirusia, 12mo. vellum, 2s 1753
GORRÆI Opera, folio, 3s 6d *Pavia*, 1629
GOULARD on the Effects and various Preparations of Lead, by Arnaud, 12mo. bd. 1s 1775
GRANTHAM (J.) Facts and Observations in Medicine and Surgery, 8vo. 3s 6d 1844
GREW (Dr. N.) Catalogue and Description of the Natural and Artificial Rarities belonging to the Royal Society, fol. bound, plates, 2s 1681
GRAY (F.) Automatic Mechanism and Artificial Limbs, 8vo cloth, 4s 1855
GRIFFITH (J. W.) on the Blood, 12mo 3s 1846
GRISENTHWAITE Essay on Food, 12mo. 1s 6d 1838
GUIDOTTI de Thermis Britannicis, plates, sm. 4to. bd. 5s 1691
GULLY (Dr. J. M.) Neuropathy, plates, 8vo. 1s 6d 1841
GUNTHER (F. A.) Homeopathic Veterinary Medicine, 8vo. 4s 6d 1847

GEOLOGY, Sketches of,—(Small books on [illegible] subjects) 2s 6d, pub. at 3s 6d 1854

[illegible] Correlation of Physical Forces, 8vo cloth, 2s 1850

HALE (Sir Matt.) Primitive Origination of Mankind, folio bd. part, 6s 1677

HALLER (Dr. A.) Pathological Observations, 8vo. 2s 1756

HARTLEY (Dr.) Observations on Man, 2 vols. 8vo. bds. 6s 1749

HARVEY and Buchanan's Synoptical Table of Diseases of the Ear, in case, 2s 1848

HARWOOD (Dr. W.) Curative Influence of the Southern Coast of England, 8vo. 2s 1828

HAUSMANN'S Handbuch der Mineralogie, 3 vols. 8vo. bd. 4s 6d 1828 47

HILDANI (Guielhelmi Fabricii), Opera, folio, bd. 5s *Franc.* 1646

HIPPOCRATIS Opera Omnia Græce, fol. vellum, First Edition, 24s *Aldus* 1526

—— Opera Omnia, Gr. fol. bd. 7s *Froben* 1538

—— Medicamentorum Omnium 12mo. bd. 2s 1596

—— Magni Coacæ Prænotiones edited by Duretus, fol. bd. 3s 6d 1665

HIPPOCRATIS coi Medicorum omnium Principis, Græce, 4to. vellum, 3s 1544

—— Doctrines and Practice of, by Riollay, 8vo bd 1s 1783

HODGSON (Rev. J. S.) Phrenology, 8vo. 2s 1839

HOFFMANII de Optima Philosophandi Ratione, 4to. half bd. 2s 1761

—— Opera Omnia cum Supplement, complete in 7 vols. fol. half calf, clean copy, 14s *Genevæ* 1748-54

—— Supplement, fol. half calf, 2s 6d 1754

HOLLAND'S (G C) Philosophy of Animated Nature, 8vo. 6s 1848

—— Moving Powers of the Blood, 8vo cl. 3s 6d

HOLLERII (Jacobi) Opera, fol. bd. 3s 6d 1664

HANNOVER'S Construction and Use of the Microscope, by Goodsir, plates, 8vo 3s 1853

HOGG (J) Microscope, plates, 8vo 5s 6d 1856

HOOPER (Dr. W.) Rational Recreations, plates, 4 vols bd 4s 1787

JACKSON (Dr. J. B. S.) Descriptive Catalogue of the Anatomical Museum of the Boston Society for Medical Improvement, plates, 8vo. cloth, 4s *Boston* 1847

—— Fevers of Jamaica, &c. 8vo. bd. 3s 6d 1791

JAMES (R.) on Canine Madness, 8vo. bd. 1s 6d 1760

—— (J. H.) on Inflammation 8vo. 4s (pub at 15s) 1833

JOHNSON (Dr. E.) Results of Hydropathy, 12mo. 1s 6d 1848

—— Economy of Health, 8vo 3s 1836

—— Life, Health, and Disease, 12mo cl. 2s

—— Influence of Tropical Climates on European Constitutions, 8vo. cloth, 7s 1836

—— Morbid Sensibility of the Stomach and Bowels, 8vo. 4s 6d 1827

HUFELAND'S Art of Prolonging Life, edited by Erasmus Wilson, 12mo 1s 6d [illegible]

JONES (Dr. J.) Mysteries of Opium Revealed, 8vo, bd, 1s 6d 17[illegible]

JONGH (Dr. L. J. de) Three Kinds of Cod Liver Oil, by Carey, 8vo. 2s 18[illegible]

—— L'huile de Foie de Morue comme Moyen Therapeutique, 8vo 2s 18[illegible]

JOSSIUS de Voluptate et Dolore, &c. sm. 4to bd. 1s 6d 15[illegible]

KEBBELL (Dr. W.) Prevailing Diseases of Towns, 12mo cl. 2s 6d 18[illegible]

LARDNER'S Hand-book of Natural Philosophy and Astronomy, 3 vols. 8vo. cl. 25s 18[illegible]

LEE (E.) Hydropathy and Homœopathy impartially appreciated, 12mo, 2s 18[illegible]

—— Medical Organization and Reform, 8vo 1s 6d 18[illegible]

—— Animal Magnetism and Homœopathy, 8vo. 2s 18[illegible]

—— on Nervous Disorders, 8vo. 1s 6d 18[illegible]

LEFEVRE (G.) on Cholera Morbus, 8vo. 1s 18[illegible]

—— on the Nerves, 8vo. cloth, 3s (pub. at 9[illegible]

Lane's Compendium of Materia Medica and Pharmacy, 18mo cl. 2s 18[illegible]

LIND (Dr. J) on the diseases of Hot Climates, 8vo bd 1s 6d 18[illegible]

—— on Scurvy, 8vo bd 1s 6d 17[illegible]

LOCKE (J.) Philosophical Works, edited by St. John, roy. 8vo 8s (pub. at 16s) 18[illegible]

London and Provincial Medical Directory, 12mo. 1s 6d 1841 ditto, 12mo. 2s 18[illegible]

—— Ditto, with Scotland and Ireland, 12mo cloth, 4s 18[illegible]

LYELL (Sir C) Manual of Elementary Geology, 8vo. cloth, 8s 18[illegible]

MACILWAIN (G.) Medicine and Surgery, one inductive Science, 8vo. 4s 6d 18[illegible]

—— Unity of the Body and Sympathy, 8vo 2s 6d 18[illegible]

MACKNESS on the Climate of Hastings, 8vo 2s 6d 18[illegible]

Magni Philosophorum Arcani Revelator, 18mo vellum, 2s 16[illegible]

MALPIGHII Opera Omnia, plates, fol bd 7s 16[illegible]

MANGETI (J. J) Bibliotheca Pharmaceutico, 2 vols. fol. vellum, *portrait*, (clean copy) 10s 6d *Colon. Allob.* 17[illegible]

MANNINGHAM (Sir Rd) on Febricula, 12mo bd 1s. 17[illegible]

MANTELL'S Fossils in the British Museum, plates, 12mo. cloth, 4s (pub. at 6s) 18[illegible]

Maraviglosi Secreti Medicinali, 18mo bd. 1s 6[illegible]

MARROW of Physicke, or a learned discourse on the several parts of Man's Body, sm. 4to bd. 5s 16[illegible]

Martin's Diseases of Invalids on their return from Tropical Climates, 8vo cl. 1s 6d 18[illegible]

MARTINET (L) Manual of Pathology, by Jones Quain, 18mo, 2s 6d 18[illegible]

—— Therapeutics by Norton, 18mo. 1s 6d 18[illegible]